THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LXIV. No. 1647.] LONDON, DECEMBER 4, 1894. [46TH YEAR. PRICE 6d.

JAMES OAKES & Co.,
ALFRETON IRON-WORKS, DERBYSHIRE,
AND
Wenlock Iron Wharf, 21 & 22, Wharf Road,
CITY ROAD, LONDON, N.,
Manufacture and keep in Stock at their Works (also large stock in London)
PIPES and CONNECTIONS, 1¼ to 48 inches in diameter, and make and erect to order RETORTS, PURIFIERS and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.
NOTE.—Makers of HORSLEY'S PATENT SYPHONS. These are cast in one piece, without Chaplets; doing away with bolts, nuts and covers, and rendering leakage impossible.

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Special Quotations to Gas Companies.
DARTMOUTH, DEVON.

Lanemark Coal Co.,
LIMITED.
LANEMARK CANNEL AND GAS COALS.
Quotations and Analysis on application to
LANEMARK COLLIERY,
NEW CUMNOCK, N.B.
Shipping Ports: All the principal Scotch Ports.

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Manufacturers & Contractors.
THE ONLY MAKERS OF
PATENT ANTIMONY PAINT,
Parker's Imperial Black Varnish,
Oxide Paints, Oils, and General Stores for Gas and Water Works.
WORKS:
ORMSIDE STREET, OLD KENT ROAD,
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Ashmore, Benson, Pease, & Co., Ld.,
STOCKTON-ON-TEES,
Manufacturing Gas Engineers.
See Advt. p. 1093 of this week's issue.

CARLESS, CAPEL & LEONARD,
HOPE CHEMICAL WORKS, HACKNEY WICK, LONDON, N.E.,
And at Pharos Works, Hackney Wick.
NAPHTHA AND GASOLINE DISTILLERS AND PETROLEUM IMPORTERS,
Specially distil Carburine Spirit, specific gravity ·680, or of any other grade suitable for Enriching Gas, also Gas Oil best adapted for injecting into the Retorts, as in the Herring Process.
Importers of Petroleum for Carburetting Water Gas, or for Manufacturing Oil Gas. Distillers of Petroleum Ether and Naphtha for clearing the pipes of Naphthaline, &c.
Samples and Prices may be had on application.

MELDRUM'S Patent
Gas EXHAUSTER & GOVERNOR.
ABSOLUTELY AUTOMATIC.
REQUIRES NO ATTENTION WHATEVER.
Guaranteed perfectly steady Gauge, no matter how Steam Pressure may vary.
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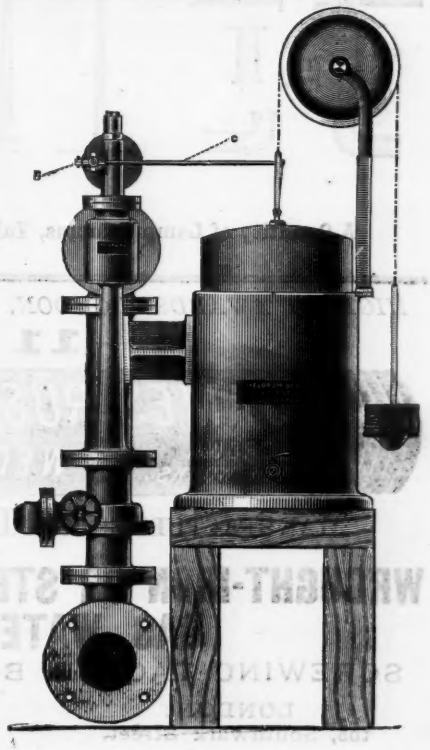

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PURIFIERS, CONDENSERS, SCRUBBERS, HYDRAULIC MAINS, and all kinds of GAS APPARATUS,

Wrought-Iron Roofs, Bridges, Girders, &c.,

Steam, Hot Water, and Range Boilers, Tanks, Cisterns, Boats, and all kinds of Wrought-Iron Work.

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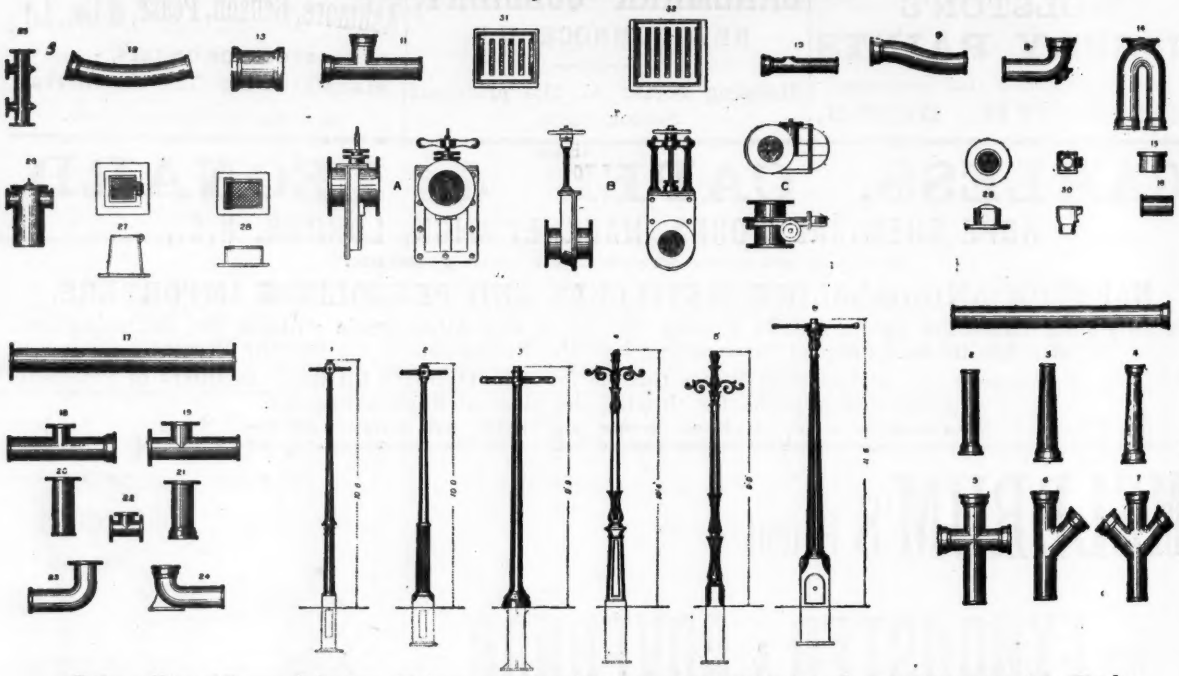

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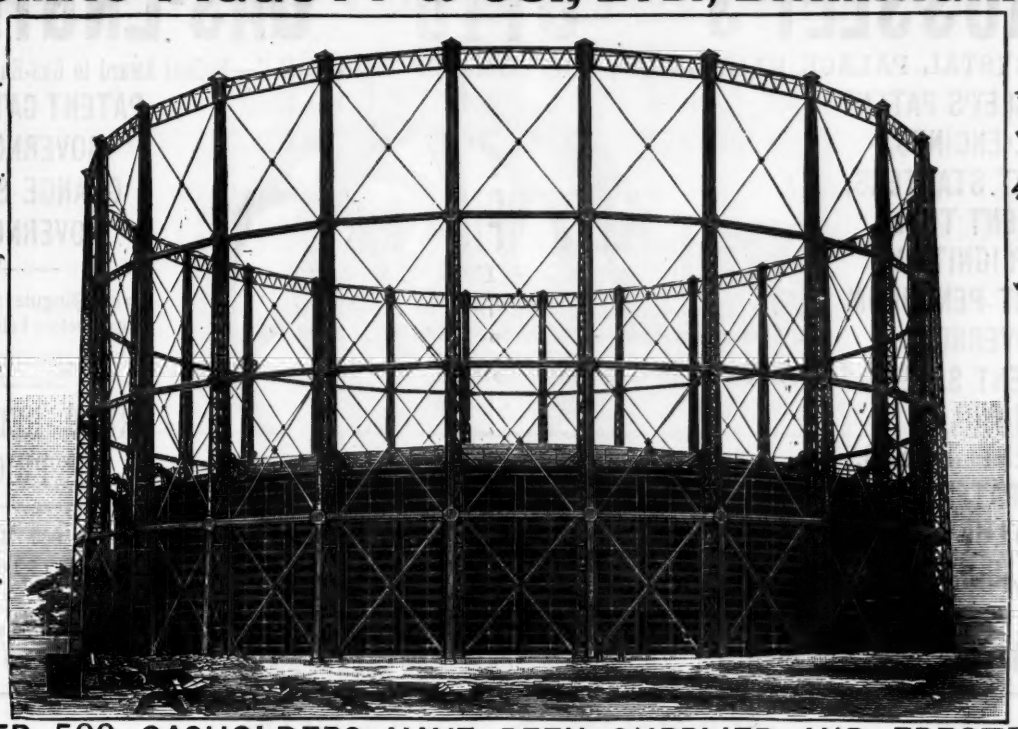

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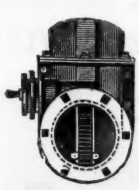
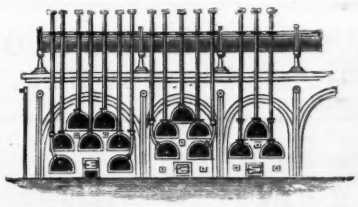
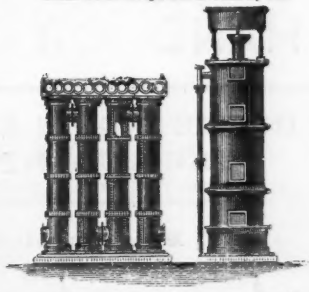
CENTRE-VALVES

for working Purifiers,

Also Bye-Pass & Stop Valves.







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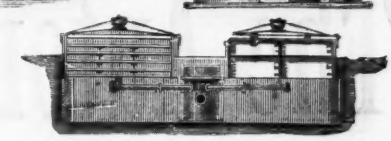

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Pig Iron (*Special Quality*) for ENGINE CYLINDERS, &c.

GAS COAL FAMOUS FOR ITS UNRIVALLED EXCELLENCE.

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CRYSTAL PALACE EXHIBITION, "DIPLOMA OF HONOUR"—Highest Award to Gas-Engines.

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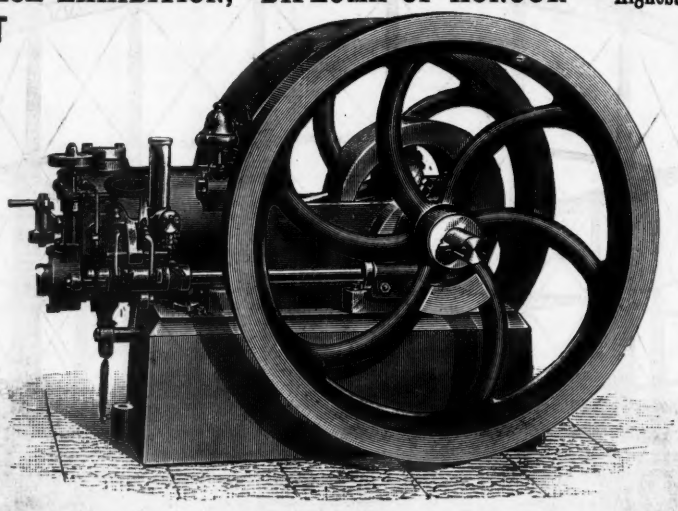

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Every Engine thoroughly tested before being sent out

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FIRE-CLAY GAS-RETORTS, FIRE-BRICKS, LUMPS, & TILES of Every Description.

GLAZED BRICKS AND PORCELAIN BATHS.

What is the Continuous?

IT IS A PREPAYMENT ATTACHMENT

THAT IS

UNFAKEABLE & UNBREAKABLE

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THE MONEY IN THE BOX IS ALWAYS EXACTLY CORRECT WITH THE AMOUNT OF GAS CONSUMED.

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PURIFIERS with Planed Joints.

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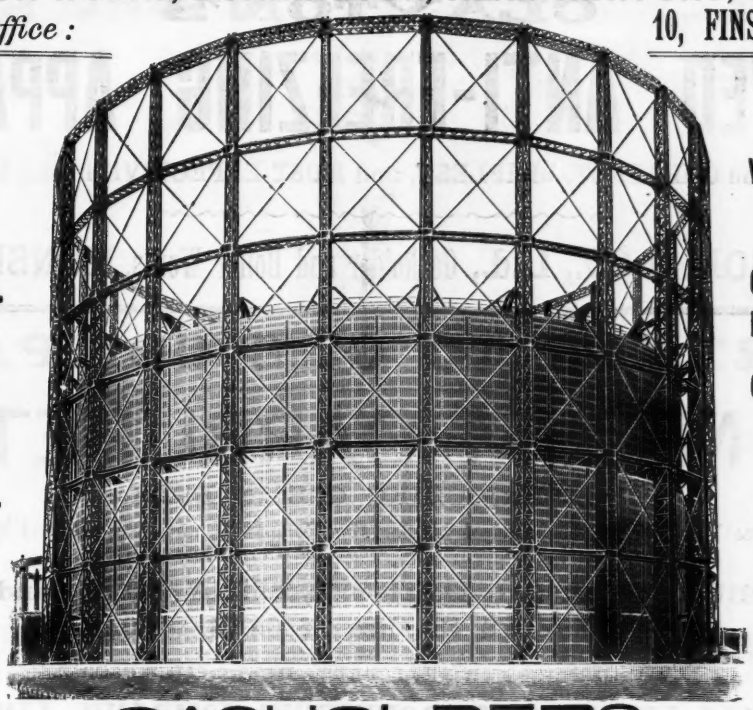
CONDENSERS.

TAR PLANT.

SULPHATE OF AMMONIA PLANT.



GASHOLDERS.

WASHERS.

WASHER-SCRUBBERS.

CLAUS' SULPHUR-RECOVERY PLANT.

CENTRE & FOUR-WAY VALVES.

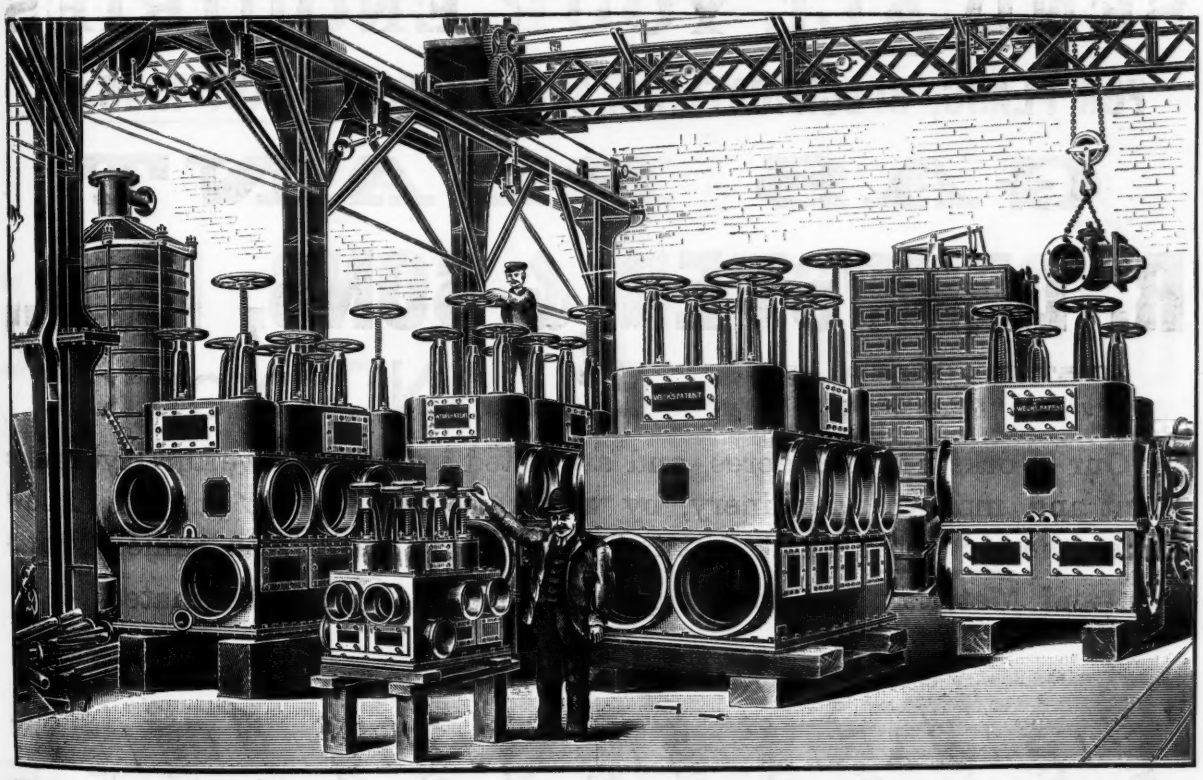
CRIPPS' HYDRAULIC MAIN VALVE.

RETORT-MOUTHPIECES.

SLIDE-VALVES, TAR-BURNERS, SIEVES.

The above is a view of the largest Gasholder (four-lift) of The Gaslight and Coke Company, Beckton, containing 8 million cubic feet, erected by us in 1892.

WECK'S PATENT CENTRE-VALVE.



The above is a copy of a Photo. of two out of Four 24-inch Eight-Way Valves for Belfast, one 24-inch Four-Way for Manchester, one 20-inch Eight-Way for Harrogate, one 6-inch Six-Way for Sheffield. These Valves were Photographed before being dispatched from our Works.

Sole Makers: C. & W. WALKER.

PREVENT YOUR GASHOLDER CUPS FROM FREEZING

BY USING

CLAYTON'S

IMPROVED ANTI-FREEZING APPARATUS

It is the CHEAPEST, SIMPLEST, and MOST EFFECTIVE in the Market.

CLAYTON, SON, & CO., Ltd., Gasholder and Boiler Works, HUNSLET, LEEDS

IMPORTANT TO GAS COMPANIES.

THE MAXIM CARBURETTOR,

FOR ENRICHING GAS IN BULK.

Used for the last Three Years by all the principal London Gas Companies, and since adopted by numerous Suburban and Provincial Companies and Corporations.

THE CARBURETTOR is INEXPENSIVE, EASILY FIXED, and ENTIRELY SUPERSEDES the use of CANNEL COAL.

FOR PRICES AND FULL PARTICULARS, APPLY TO

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SEND ALL YOUR ENQUIRIES

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ESTABLISHED 1855.

Telegrams: "DEMPSTER, ELLAND."

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Our Works cover 9 acres, and are fitted up with Powerful Hydraulic Plant and modern Machinery, by which we are able to supply, at low Prices, the very best Plant that it is possible to make with skilled Workmen and Materials of superior quality. No charge for Estimates.

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CONSTRUCTION OF COMPLETE GAS-WORKS A SPECIALITY.

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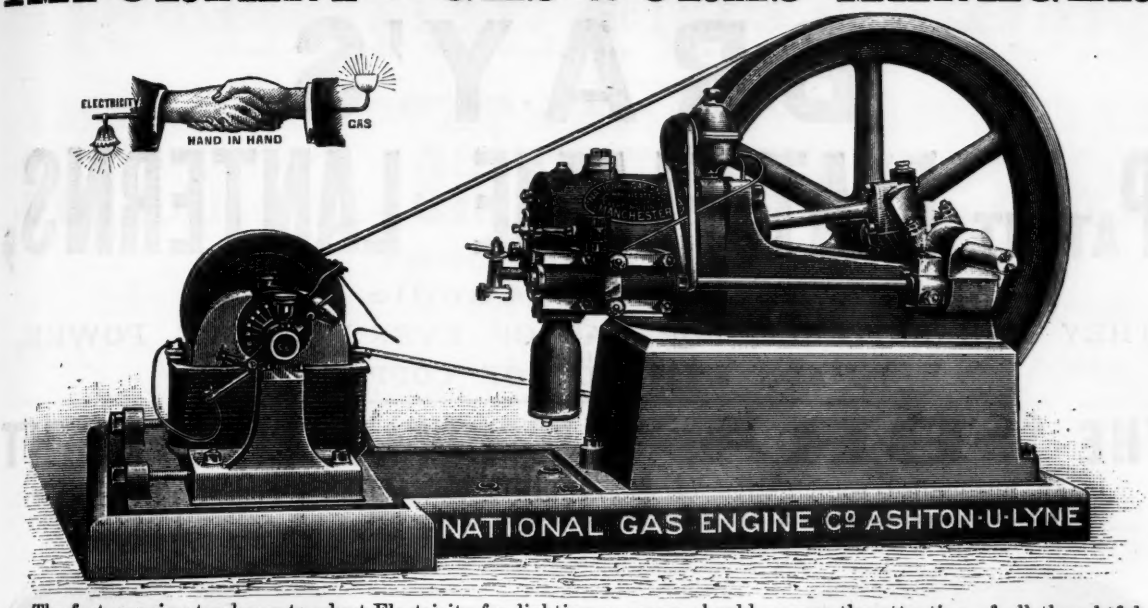

The fast growing tendency to adopt Electricity for lighting purposes should engage the attention of all thoughtful Gas Works Managers and those interested in Gas Companies.

By the aid of the Gas-Engine driving the Dynamo, **50 PER CENT. MORE LIGHT CAN BE OBTAINED FROM THE SAME GAS**; and thus, by their adoption as the motive power, the gas consumption of the district can be maintained and the light increased.

The **NATIONAL GAS-ENGINE** is specially constructed for this purpose, both for Small Installations for isolated places, and also for large Central Electric Light Station Work.

For Prices, Testimonials, and List of Users, apply to

THE NATIONAL GAS-ENGINE CO.,

ASHTON-UNDER-LYNE.

District Agents Wanted.

TO GAS COMPANIES, CORPORATIONS, AND VESTRIES.

IMPROVED STREET LIGHTING

WITHOUT ADDITIONAL COST,

With THREE to FOUR TIMES the ORDINARY LIGHT,

CAN BE OBTAINED BY

THE INCANDESCENT GAS-LIGHT (Welsbach System)

The Inspector of Lighting in Glasgow reports that **THE ANNUAL COST OF GAS FOR TEN INCANDESCENT GAS-LAMPS WAS £17**, as against **£39** with the old system, while obtaining **FOUR TIMES THE AMOUNT OF LIGHT.** The experiment lasted from May to November, during which time **ONLY FOUR MANTLES WERE USED FOR TEN LAMPS.**

Send for "Street Lighting" Pamphlet, which gives full particulars, to

THE INCANDESCENT GAS-LIGHT COMPANY

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BRAY'S

PATENT FLAT-FLAME LANTERNS,

From 30 to 1100 Candle Power.

THEY ARE SUITABLE FOR GAS OF EVERY CANDLE POWER,

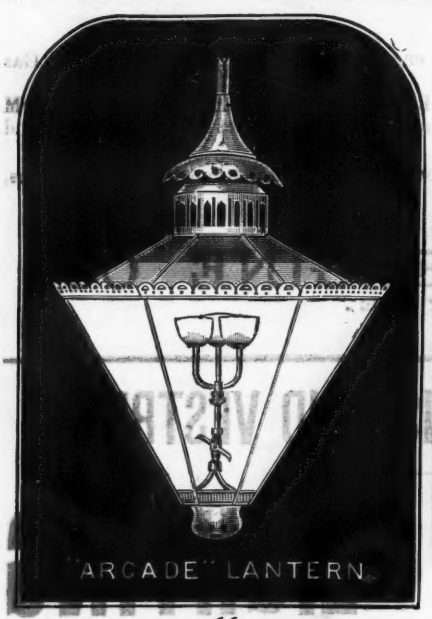
MADE ENTIRELY OF COPPER.

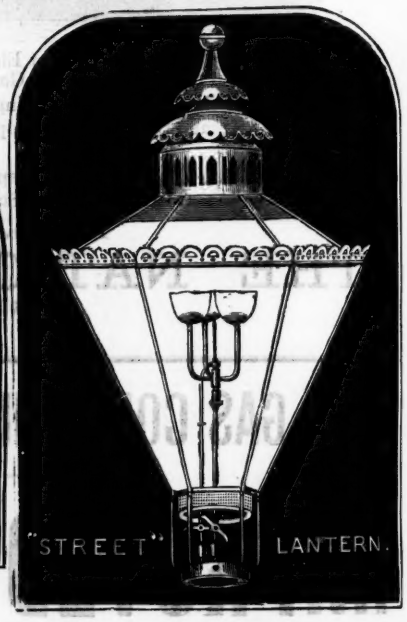
THE "BRAY" REFLECTING LIGHT

Is an unequalled combination of SIMPLICITY, CHEAPNESS, and EFFICIENCY.

GIVES REMARKABLE LIGHTING VALUE FOR GAS CONSUMED.

SEND FOR PRICES AND PARTICULARS.





BRAY'S "SPECIAL" AND "ADJUSTABLE" BURNERS

Are the best in the Market for general use, and are very moderate in price.

It is not unusual to see the ordinary Burner yielding less than half the light that Bray's "Specials" and "Adjustables" would yield with the same consumption of Gas.

Gas Managers should try them on Consumers' Fittings; and they would see at once how to compete more effectively with the Electric Light.

Specially adapted for use with Penny-in-the-Slot Meters, for which purpose large quantities have been sold.

SEND FOR PRICES AND PARTICULARS.

GEO. BRAY & CO., GAS LIGHTING ENGINEERS, LEEDS.

R. LAIDLAW & SON.

IMPROVED WET AND DRY GAS-METERS

IN CAST-IRON AND TIN CASES.

Two Gold Medals, One Silver Medal, One Bronze Medal, and Two Honourable Mentions,

INTERNATIONAL EXHIBITION, EDINBURGH. 1886.

A LARGE STOCK OF GAS AND WATER METERS ALWAYS READY FOR IMMEDIATE DELIVERY OR SHIPMENT.

STATION METERS,

WITH ROUND OR SQUARE CASES.

PRESSURE REGISTERS.

Improved Station and Exhauster Governors.

Lamp Pillars,
WITH EITHER WET OR DRY METERS FOR AVERAGE METER SYSTEM.

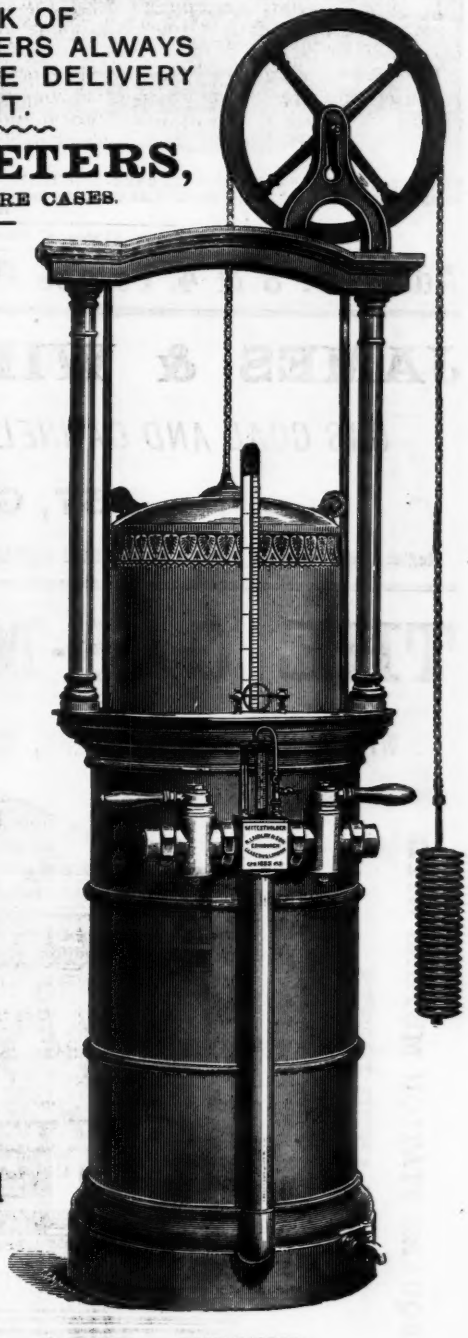
Experimental Hourly-Rate and Test Meters.

Experimental Apparatus.

Pressure Gauges.

Condenser Thermometers.

Siemens' Patent Water Meters, and Gas Apparatus and Fittings.



TEST-HOLDER.

STANDARD TEST-HOLDERS AND TEST-METERS FOR OFFICIAL INSPECTORS, &c.,

AUTHORIZED BY THE BOARD OF TRADE STANDARDS DEPARTMENT.

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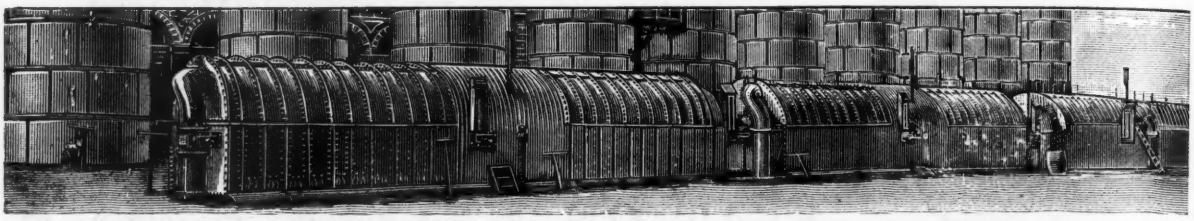
KIRKHAM, HULETT, & CHANDLER, LD.

PATENT "STANDARD" WASHER-SCRUBBER

☛ **484** of these Machines (capable of dealing with **464,490,000** cubic feet of Gas daily) in use which fact is given as evidence of this apparatus being the Most Efficient of any in the Market for the extraction of Ammonia, Carbonic Acid, and Sulphuretted Hydrogen from Coal Gas.



View of SIX PATENT "STANDARD" WASHER-SCRUBBERS, erected at the Beckton Station of The Gaslight and Coke Company (the Engines driving same being under Galvanized Iron Covers). This Company have **30** of these Machines in use. They are also in operation at a great number of Gas and other Works in this Country and Abroad.

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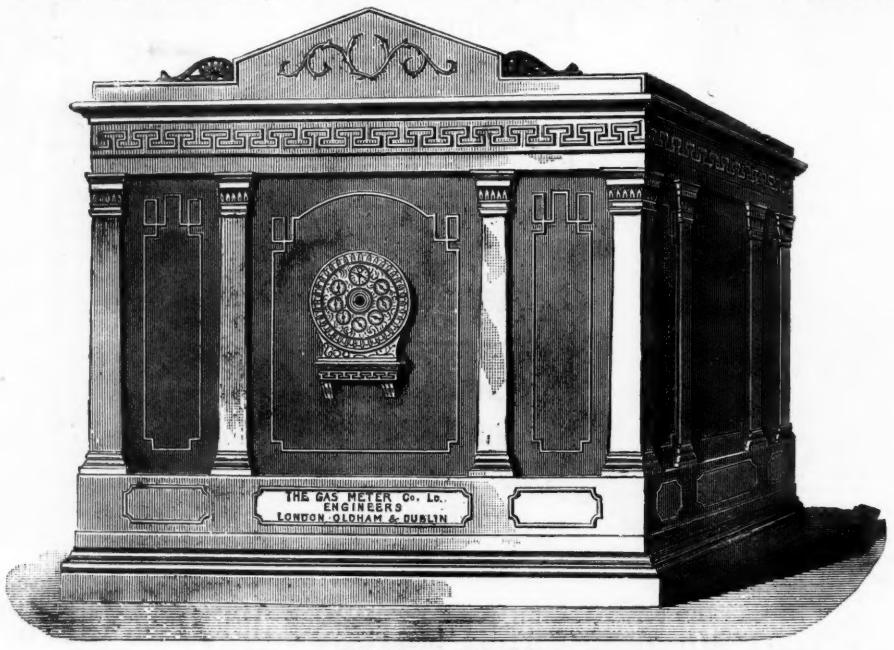
MANUFACTURERS OF LIMITED

WET AND DRY GAS-METERS, STATION METERS, GOVERNORS, GAS APPARATUS, ETC.

SQUARE STATION METERS WITH PLANED JOINTS.



STATION METERS IN CYLINDRICAL CASES.

DESIGN No. 2 PATTERN.

STATION METERS MADE AT THE COMPANY'S WORKS, OLDHAM, LATE WEST & GREGSON. **Established 1830.**

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Telegraphic Address: "METER."

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INCORPORATED IN
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LONDON OFFICES & DEPÔTS:
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LIVERPOOL:
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LEEDS:
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Have been made in large quantities for the last twelve years; and during the whole of that time, have been in regular use at most of the largest Gas-Works in the Kingdom. They possess the excellent quality of remaining as near stationary as possible under the varying conditions of their work—a quality which will be appreciated by all Gas Engineers and Managers. The generally expressed opinion is that these Retorts are the very best that are made.

RETORTS CAREFULLY PACKED FOR EXPORT.

Fire-Bricks, Lumps, Tiles, &c., &c., of every description suitable for Gas-Works.

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ENGINEERS & CONTRACTORS,
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furnish Plans, Estimates, and Specifications for SINKING BOREHOLES *and* WELLS; *Erecting* RESERVOIRS, FILTER-BEDS, *and* GASHOLDER TANKS; *and* EVERY REQUISITE *for* GAS *and* WATER WORKS,

INCLUDING

MAIN LAYING

EXCHANGE TELEPHONE 1756.

JOHN BROWN & CO., LTD., SHEFFIELD,

Proprietors of

ALDWARKE MAIN CAR HOUSE & ROTHERHAM MAIN COLLIERIES, NEAR ROTHERHAM.

ALDWARKE MAIN GAS COAL

Analysis: 12,600 feet of 19-candle gas per ton.
Weight of illuminating power in pounds of sperm, 820·80. Very free from impurities.
Telegrams: "ATLAS SHEFFIELD."

AN APPARATUS WHICH PERFORMS THE COMBINED DUTIES OF

TAR-EXTRACTOR, WASHER, AND SCRUBBER.

THE "CHARLES HUNT" PATENT WASHER

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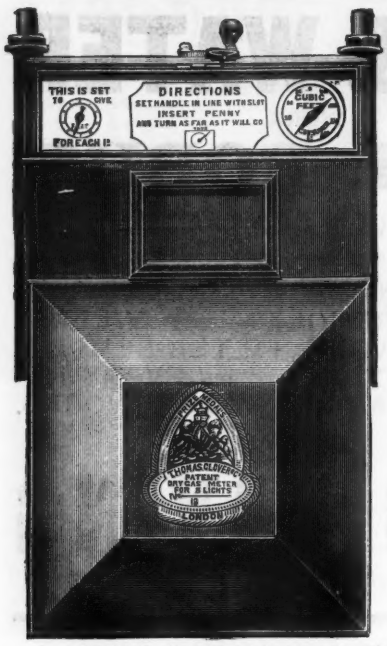

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[See also Advt p. 1098.

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THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, DECEMBER 4, 1894.

The London Gas Consumers' League.

So quiet has the Gas Consumers' League of London kept itself of late, that one might have been forgiven for suspecting that it had been killed, as representing a popular movement, by the last reduction in price of The Gaslight and Coke Company. This does not seem to be the case, however, if the meeting of the League, which was held somewhat unexpectedly last Thursday, may be taken as evidence of continued life. And yet it might be argued with much plausibility that the proceedings on this occasion showed no more than that the organizers of the movement are in extremity for means of keeping it alive, to say nothing of kicking. Mr. James Rowlands, the prime moving spirit of the organization, was in the chair; and he told a dismal tale of discouragement by the cold-blooded officials of the Board of Trade, and lack of the wherewithal to carry on the agitation. Mr. Bryce, the President of the Board, has confessed his inability to hold a departmental inquiry into the operation of the laws under which London is supplied with gas; and he has dared to take but scant notice of an inquiry addressed to him on behalf of the League respecting the detail of meter-rents. Notwithstanding this "cold-shouldering" of the League by Mr. Bryce and his minions, Mr. Rowlands and his friends still hope that there is enough in the difference between the prices charged by The Gaslight and Coke Company in their districts north and south of the Thames respectively to stir up the great heart of the people to such action as shall cover both the Board of Trade and the Gas Company with confusion. Meanwhile, it is a first necessity that the people whom Mr. Rowlands and his friends desire to serve should put their hands into their pockets for that which is the "sinews of war," in order that the agitation may be carried on. If the gas consumers of London are wise, they will keep their money.

We have nothing to say of the manner and machinery by which Mr. Rowlands thinks to keep up his organization of gas consumers, such as it is, because we know nothing about either. We have known, however, something of gas consumers' agitations in the past; and many of these movements have been discredited by proceedings in the name of "the cause," with which it is quite certain that neither Mr. Rowlands nor his respectable associates of the present would like to be connected, while very few of them ever did the smallest good, even in times when the modern system of gas supply control in the joint interest of consumers and producers was unknown. It is idle for these latter-day gas agitators to cry for a correction of the inequality of gas prices in different parts of London by the process of unification; for to strike an average would mean raising the price of the cheapest gas to private consumers in a very large district, and for public lighting over a still larger area. This course would naturally arouse the strongest opposition from those who would be injuriously affected by it; and consequently it is not to be thought of. What Mr. Rowlands and his colleagues really mean is that the top price of gas in London is too high, and ought to be reduced. There may be many people who agree with him in this; but it is one thing to point to a commodity as dear, and another to show how it might be cheapened. The discontented gas consumers of North London may rest assured of one thing, however—they will never get their gas cheapened by making other consumers pay more. They are welcome to suggest any lawful and adequate course they can think of for enabling The Gaslight and Coke Company to sell gas at a lower rate; and if the proposal is reasonable, Parliament will consider it. At present, the Company work under the sliding-scale; and if this has failed to encourage good management, perhaps Mr. Rowlands has a more promising scheme of regulation to bring forward in the fulness of time. But, if so, what is the need for a League? Why not lay the matter before the Directors of the Company; and, if they prove obdurate, bring it under the notice of a general meeting of the shareholders? Candidly, we have often criticized the conduct and condition of The Gaslight and Coke Company's undertaking; but we can neither see how the Board of Trade, or a Parliamentary Committee, or a Royal Commission, could improve matters here, nor how Mr. Rowlands and his band of parochial busybodies can hope to solve a puzzle that has defied the powers of far more experienced men.

The Affairs of the Birmingham Gas Department.

THE Birmingham Corporation Gas Committee appear, by the report which is to be presented to the City Council to-day, to have had a successful year's trading; the most obvious and satisfactory evidence to this effect being the reduction in the price of gas by the 3d. put on to meet the extraordinary expense incurred by the department in consequence of the coal strike. When they raised the price of gas last year, the Committee engaged that, so far as the issue lay in their power to control, the increase should only be temporary; and they must be individually and collectively as gratified as the consumers at being able to be as good as their word. Very extensive works are to be proceeded with at the Windsor Street and Swan Village stations, with the object of extending the application of the Arrol-Foulis system of mechanical retort-stoking. The

Committee state that, with regard to this matter, "they "have arrived at the opinion that at present stoking and "charging by machinery is the more economical process "of carbonization in long retorts, and, moreover, that it "affords greater relief to the workmen." The latter is a politic touch, probably put in to recommend the proposal to the Labour members of the Corporation, who, unless they differ in Birmingham from their like in other towns, regard the displacement of manual by mechanical power in gas making with but lukewarm approbation. Mechanical retort-stoking is making headway, however, whatever the Gas Workers' Union may say or do to prevent it; and the testimonial now given by the Birmingham Gas Committee to a particular kind of carbonizing machinery will make it go farther and faster. The Committee do not seem very enthusiastic on the subject of prepayment meters, although it is satisfactory to hear of their co-operating with the Improvement Committee to place gas at the disposal of the dwellers in their artizans' tenements. This is as it should be; and it may be hoped that the more experience the Gas Committee have of the prepayment meter, which indeed first saw the light—or perhaps it would be more pointed to say first gave a light—in Birmingham, the better they will like it. There is something ominous in the sound of the reduction ordered by the Committee in the price of coke.

The Parliamentary Notices.

In another part of the present issue will be found the parliamentary notices for the ensuing session. They make a poor show in regard to gas; while water is very much to the fore. The South Metropolitan Company's Bill, already noticed in the Journal, and the legislative scheming of the Corporation of Dublin, are the most important of the projects affecting gas, after which come the Chesterfield and Ambleside transfer proposals, and the Hebden Bridge Bills. Several limited Gas Companies intend going for statutory authority. The British Gaslight Company, Limited, seek further powers for their Potteries undertakings; and the Scarborough and Ilfracombe Companies want more capital. The tale of proposed Gas Provisional Orders is also short, and of a very ordinary character. Altogether, Westminster will be dull next session, so far as the gas department of its responsibilities is concerned. For one cause, this is rather a pity. It might have been expected that more companies would have taken an early opportunity of improving their capital arrangements after the Bristol model, especially as the present Chairman of Committees of the House of Lords has shown himself so apt in appreciating the principles of gas supply finance. There is nothing to be said about the subject-matter of the notices that have not already been commented upon, although it is possible that more than one of the minor Bills will give rise to some sharp fighting in Committee.

The Parish Councils Act in Operation.

This day marks the commencement of a new era in the history of the development of local self-government in England and Wales; for the principal fruit of the legislative labours of the last session of Parliament, commonly known as the Parish Councils Act, begins to take effect in the holding, in every one of 13,000 rural parishes, of a statutory meeting to decide whether the parish shall have a Council, and, if so, who is to be elected to it. The Act provides that this means of self-government shall be imperative in the case of parishes of 300 inhabitants and upwards, in which it will take the place of any older system of government that may have been in existence. Thousands of parishes, it may safely be presumed, will govern themselves directly through the parish meeting; but many Councils will also be elected, and many Local Boards will disappear. A new order of sanitary authorities will be created. In urban districts which are also municipal boroughs, there will be no change at all; but in urban districts which are not municipal boroughs, there will be a change both in the name and in the constituency of the sanitary authority. Instead of the Local Boards, there will be Urban District Boards—not a change for the better for those who will have to use the new title for journalistic and other purposes, inasmuch as it consists of three words instead of two, and vaguer words at that—and the members of these bodies will have to be chosen by "parochial electors," who belong to three categories which need not be defined here. In rural districts, again, the old Sanitary Committee of the Board of Guardians is to be now replaced by a brand-new Rural District Council, the members of which are to be *ipso facto* members of the Board of Guardians for the whole Union. In the case of a Union consisting partly of an urban and partly of a rural district, there will be no less than three governing bodies, to say nothing of the County Council. Very many and various powers will belong to the sanitary authorities, with whom gas companies will have to deal very respectfully. So far as gas supply is concerned, it appears that the new bodies will only be able to become consumers of gas for public lighting in the event of their taking powers under the so-called "Adoptive Acts," which are a set of five statutes placed at the disposal of the parochial electors if they choose to go in for more improvements than are contemplated in the Parish Councils Act. The first of these is the Lighting and Watching Act of 1833. This requires a two-thirds majority for its adoption, either at the parish meeting or on a poll. The limit of the rate to be levied must be fixed by the parish meeting; and the Parish Council will then administer the Act. It has been justly remarked that two or three petroleum lamps fixed at critical corners of a village, and lit for a few hours during winter evenings, will be as much as many rural parishes will care for in the way of public lighting; and we doubt if they will be in a hurry to do even this. In the suburban parishes, however, the powers of the Act will be found very desirable. The particular order of new local authority with whom gas companies will have most important business and statutory relations will be the District Councils, who will in three years' time succeed to all the powers of Highway Boards, and practically have the status of a municipal authority in a borough town.

Two Municipal Enterprises.

Those perfervid politicians who wish to municipalize or nationalize everything, may be recommended to study a weighty article upon "Municipal Enterprise" which was published in *The Times* of the 30th ult. The writer begins by remarking that those politicians who, like Mr. Asquith, are desirous to unbend to the Independent Labour Party, will be glad to note the growing demand for municipal enterprise in the North of England. They will not be satisfied to see corporations undertake the supply of gas, water, electric power, or other monopolized products. Municipalities must now go far beyond such simple undertakings, and enter into competition with rivals small and great. They must struggle against railway companies, as in Manchester by means of a canal; or against dock companies, as at Preston. It is not sufficient that a municipality should devote large sums from the rates towards new undertakings, as in the case of Hull and the Hull and Barnsley Railway. Eventually it becomes necessary for municipal representatives to have the chief or sole control in the subsidized undertaking. This is what has happened in the important enterprises undertaken by both Manchester and Preston; and *The Times* writer sets forth the result, for the instruction of those municipalities who may be inclined to follow this example. With regard to the Manchester Ship Canal, it is stated that, after eleven months' working, the traffic shows a tendency to fall off rather than to increase. "The commerce that was to "keep the waters of the canal covered with hurrying ships "either does not exist, or continues with exasperating "obstinacy to flow in the older channels." But it is only fair to remember that the Manchester Ship Canal was not originally a municipal speculation. The Corporation have advanced five millions sterling to finish it; and now an uncertain, but large, amount is still wanted to equip and keep it going. For the present there is no trade, and no proper conveniences for dealing with any trade that may come. "The city rate has advanced from "4s. 2d. to 5s. in 1892, to as much as 7s. in the pound. "In a little more than twelve months, a further burden of "1s. 8d. in the pound is threatened as a Ship Canal tax." So there is small chance of the consumers of Manchester Corporation gas having it any cheaper during the lifetime of the present generation. Preston has made a similar loss. For years the development of the Ribble navigation was a cardinal point of local "Progressivism." No candidate for municipal honours in Preston had a chance of election unless he was "sound" upon this particular "goose." Accordingly, in 1883, statutory powers were obtained by the town for spending £650,000 upon the popular enterprise. The total outlay up to the present

time has been £1,110,000; and the rates of the town stand at 7s. 3d. in the pound, whereof 2s. 1d. is on Ribble account. The dock revenue only meets working expenses —interest on capital being paid entirely out of the rates. "The ratepayers, in addition to the financial penalty, "practise very considerable self-denial, and forego much "expenditure in ordinary channels. The paving and light-"ing of the town are reduced to a minimum charge;" and gas consumers, it may be added, have at least the satisfaction of knowing they are not paying rates twice over, like their less fortunate compeers of Manchester.

Pan-Anglican Legislation.

A PROPOSAL has been made by Mr. Ilbert, in a paper recently read at the Imperial Institute, for the systematic collection of all the statutes passed by English-speaking self-governing communities, to serve as a basis for the study of comparative legislation. The idea is distinctly good; and it has been applauded by every public man who has taken notice of it. Sir George Bowen, for example, speaks of the proposal as being pregnant with "vast and "far-reaching importance to the entire English-speaking "race;" and it is considered that, in some form, the idea may not be difficult to carry out. Indeed, something in the same direction has already been accomplished; for the Governors of several of our colonies send home to certain libraries copies of the statutes passed by the Colonial Legislatures. The suggestion of *The Times* is that a comprehensive Institute might be formed of deputations from every legislative assembly, not only in the empire, but wherever the English-speaking race is found. London would be the proper home for such an Institute; and "by a system of exchanges there might soon be gathered "together, not only here, but in all the chief towns of the "empire and the United States, substantially complete "collections of the laws under which those using the English "tongue live." This is a grand idea; and everyone who is interested in good government must hope it may be carried out. It is admitted by *The Times* that the immediate and direct gains from the realization of Mr. Ilbert's scheme might not be great. A record of legislative failures and experiments in the past or in another clime would not always be directly instructive to a statesman busy over the satisfaction of present and local wants. Surroundings count for so much; the mode in which the law is administered counts for more. "The notion of "a Pannomion, or complete code of laws, suitable for use, "like well-made machines, in all climates, was a favourite "one with Bentham and his disciples. Sensible men now "know that ready-made statutes never quite fit those who "must use them." The conclusion is nevertheless drawn that the argument for Mr. Ilbert's proposal is not much weakened by this admission. One ground is unassailable. Whereas during the first half of this century the model of legislation which found most admirers throughout the civilized world was the Code Napoleon, until it seemed at one time probable that most of the new legislation of the world would approximate to it in form and in spirit, now all this is changed. "English legislation holds the field. "The English type of statute, slowly evolved from the "cumbrous forms in use in the last century, is at present "the pattern on which the Legislatures of young coun-"tries are modelling their statutes." If this lead is to be kept and to do all the good possible under the conditions, it is worth while doing the utmost to forward an undertaking which has been launched amid almost universal good wishes. Not the least of the subjects of legislation that would have a strong light thrown upon them by the operation of the scheme now in question is gas supply. Curiously enough, in an otherwise egregious book upon the actual condition of the City of Chicago at the time of the Exhibition, the author mentions the unsatisfactory state of the gas supply, and has perspicacity enough to trace this to its source in the bad system under which franchises for gas supplies are granted in the United States. He does not recommend the introduction into America of our cumbrous system of Private Bill legislation, but thinks that something of the spirit of the English law relating to gas supply might be put into some acceptable American administrative form. If Mr. Ilbert's idea is properly carried out, some of us may yet live to see the best kind of legislation, wherever it may happen to originate, prevail throughout all English-speaking countries, which would be vastly to the world's advantage.

WATER AND SANITARY AFFAIRS.

THE statutory notices for Bills to be introduced in the next session of Parliament include several respecting the water supply of towns. We have already mentioned the Bills of the Chelsea and Lambeth Companies, as well as the eight Bills of the County Council for acquiring the Metropolitan Water Undertakings, and the peculiar Bill of which the Commissioners of Sewers have given notice. The Surrey County Council, as we reported last week, hold to the doctrine that it is inexpedient for the water supply of Surrey to be under the control of the London County Council; and consequently the present attitude of the Surrey Council is that of "watching" the proceedings of the other body. As an engineering question, it seems almost impossible to lop off from the London system just one particular part as being immediately connected with the water supply of Surrey "over the border." The question affects both the Southwark and Vauxhall and the Lambeth areas. An absolute transfer of the local supply by purchase thus appears impracticable. Perhaps there is some solution in the plan proposed by the Lambeth Bill, under which the provisions of the Metropolis Water Acts of 1852 and 1871 would be extended to outlying parts of the Company's district, the County Councils of Kent and Surrey to be constituted the Metropolitan Authority under these Acts. There are merits in this plan; and yet, if the London County Council should ever get possession of the water undertakings, there would be great risk of the outlying Councils being thrust aside in the process. The present attitude, as well as the expectation of the London County Council, may be gathered from the somewhat famous periodical in which certain members of the Progressive party are understood to be interested. This distinguished organ asserts that the conduct of the Lambeth and Chelsea Companies in bringing forward Bills to authorize the construction of new works, is "like the audacity of the monopolists," seeing that the acquisition of their undertakings by the County Council "is only a matter of a very short time." Of course, it is presumed that Parliament will bow to the behest of the Council. A further remark is that "the "Water Companies, with the exception of the East "London Company, failed to make any attempt to carry "out the recommendations of the Royal Commission last "year." Yet the Southwark and Vauxhall Company were as much to the front as the East London; and the scheme contained in the Bill they carried through Parliament was distinctly in harmony with the recommendations of the Royal Commissioners. The Lambeth Bill for next session is on similar lines. A Bill promoted by the Corporation of Croydon provides for the purchase by that body of so much of the plant and rights of the Lambeth Company as relate to the supply of water to certain parts within the bounds of the borough.

Among provincial schemes, some of the most important are those which affect the watershed of the Don. The Corporation of Barnsley seek power to divert and use the water of certain tributaries of the River Porter or the Little Don, in connection with a new reservoir. But the valley of the Little Don is a spot which cannot be touched with impunity. To approach it is to invite a contest. The Dewsbury and Heckmondwike Water Board have a Bill for the construction of a reservoir on the Porter; and the Rotherham Corporation want to appropriate the same source. Even if these three bodies could agree to share the spoil, it seems doubtful whether peace would be secured. It is declared that, in promoting its Bill, Barnsley must reckon on the strongest opposition from the whole of the Local Authorities from Stocksbridge to Goole. In addition to Rotherham, it is said that Mexbro' and Doncaster can make out an extremely strong case for a share of the water of the valley. While Barnsley wants more water than it can command from present sources, both for itself and the growing townships around it, Rotherham is in difficulties in a dry season, and its supply is condemned by the Local Government Board as at all times eminently perilous to the health of the inhabitants. Doncaster is not well off; and Sheffield has to be considered. It is very properly said by a Sheffield paper, that this "grasping and grabbing of local authority against "local authority is not an edifying sight." The same organ suggests there should be a "Don Valley partner-"ship," into which Barnsley could enter. Sheffield is

now in possession of statutory power over the tributary streams of the main river as far as the junction of the Little Don. This town, with the approval and support of Rotherham, Mexbro', and Doncaster, as well as that of the populations between Stocksbridge and Sheffield, might seek power to complete its original scheme; adding the Little Don to its other gathering-grounds, and binding itself to supply water in bulk to other towns on terms similar to those adopted by Manchester. The idea has much to recommend it; and unless some understanding is arrived at, it is plain that there will be an enormous expenditure of money in a parliamentary contest, with a very slight addition, if any, to the supply of water.

In their General Bill, the Dublin Corporation include some important provisions with regard to the supply of water to the Commissioners of neighbouring townships. The charge for this supply is to be by meter. But the scheme of the Bray Township Commissioners presents features of yet greater interest. The Commissioners seek power to introduce an improved supply of water into the townships of Bray, Dalkey, Kingstown, and Blackrock; and provision is made for constituting a Joint Water Board. In carrying out their scheme, the Commissioners wish to purchase by agreement certain mains, pipes, and water rights from the Dublin Corporation, as well as to dispose of surplus water to other townships.

Particulars concerning the whole of the Water Bills will be found in the list which we publish to-day. So far as any features of general interest present themselves, apart from the Metropolitan question, these occur more especially in the schemes affecting the Little Don. The watershed principle there exhibits itself, as it is destined to do with increasing force, from time to time, in various parts of the kingdom. To take each case on its merits seems hardly sufficient for the exigencies of the situation. Some more general principle appears to be required. The intervention of the County Councils has been named; but what is really wanted, if it could be obtained, is something more in the nature of a watershed authority. A minor point, and yet one which requires to be looked after, in case it should create a precedent, occurs in a General Bill by the Kingston-upon-Hull Corporation. Authority is sought among other things "to define what shall be deemed a supply for "domestic purposes." The Corporation, being in possession of the water supply, might have made their own definition; the just and proper basis being plain enough, except for those who wish to use more water than they are entitled to.

Issue of Debenture Stock by the Kent Water-Works Company.—The Directors of the Kent Water-Works Company are inviting tenders for £20,000 of 5 per cent. perpetual debenture stock, authorized to be raised under their Act of 1877. The minimum price is fixed at £166 per £100 of stock.

Issue of Debenture Stock by the Croydon Commercial Gas Company.—An opportunity will be given to capitalists of making a permanent and safe investment in the Croydon Commercial Gas Company on the 18th inst., when Messrs. Hooker and Webb will offer for sale £13,750 of 5 per cent. perpetual debenture stock, at the Mart, Tokenhouse Yard.

Death of Mr. W. H. Vaughan.—We regret to record the death, on the 26th ult., in his 64th year, of Mr. William Henry Vaughan, for nearly fifty years a valued officer of The Gaslight and Coke Company. Mr. Vaughan received an appointment in 1846, and for the past 32 years he had occupied the position of chief of the Light Office or Rental Department. He had been out of health for some months; but he remained at his post until compelled, under medical advice, to undergo a serious operation. He retired in September last, carrying with him the esteem of the Directors and the affectionate good wishes of the staff, many of whom had been associated with him for the greater part of their lives. A large number of Mr. Vaughan's late colleagues attended the funeral, which took place at Highgate on Thursday.

Death of Mr. S. G. Stiness.—The sad news reaches us through our American contemporaries of the death, under very distressing circumstances, of Mr. S. G. Stiness, Superintendent of the Pawtucket (R.I.) Gas Company. Mr. Stiness left his office as usual on the evening of the 5th ult., and was on his way home, when, in crossing the line of the Consolidated Railroad, he slipped, and fell on to the track. Before he could rise and get clear of an approaching train, he was struck and crushed to death beneath the engine. Mr. Stiness was President of the New England Association for three consecutive years—1878 to 1880; and at the last meeting of the American Gaslight Association he was elected third Vice-President. He was held in high esteem by his professional brethren, a large number of whom attended his funeral on the 8th ult.

ESSAYS, COMMENTARIES, AND REVIEWS.

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 1084.)

DURING the past week, business on the Stock Exchange has been quiet on the whole, if all the principal departments are taken into account; and movements have been slight, and somewhat irregular. Our home rails have improved, and the important Foreign Market was fairly steady; but the American was still dull and depressed. Even the gilt-edged division have halted for awhile, though possibly to take breath for another climb. But the business in the mining world, especially South African ventures, has been something marvellous; and the settlement last week was a heavy job for those in that line. The rush for "Barings" showed restored confidence, added to abundance of money. The market for the latter commodity remains firm at the advance lately effected. The Gas Market opened with a great show of activity, but rapidly quieted down; and for the rest of the week, business was very limited indeed. Prices, however, rose with considerable freedom; and most of the leading undertakings have improved on their already substantial figures—the Metropolitan Companies being conspicuously in the van. Gaslight "A," after being a complete fixture for some weeks past, was bound to go one way or the other, and of course it went up; the finishing mark being 254—top price and the best of the week. There was much less doing in the secured issues. But higher prices were readily obtainable; and the 6 per cent. debenture and the 7 per cent. limited increased their quotations. South Metropolitans were also fairly active; and though the prices were advanced, they reached the top figures. Hardly anything was done in Commercials—sellers being scarce; and both issues were put up five points. There were very few ransactions marked in Suburbans and Provincials. But their endency to advance is unabated; and Brentfords in particular have added to their previous gains. Among the Continentals, only Imperial showed any activity, and it afforded the only instance of a retrogression in the whole list. Union is a point higher. The other Foreign undertakings are mostly without any feature; but Oriental is higher *ex div.* The lowering of the quotation in the previous week was an accidental error. The Water Companies were quiet, and very firm, with little movement; an advance in East London being the only variation.

The daily operations were: The Gas Market opened with lively business in Gaslight "A," which held firm. Brentfords were done at better figures; both issues rising 3. In South Metropolitans, "B" rose 1; and "C," 2. Business was nearly stagnant on Tuesday. Commercial old gained 3; and ditto new, 2. A little more was done on Wednesday; almost all being in Gaslights—the "A" and "H" stocks improving 2 each. Continental Union was 1 higher. Business continued very restricted on Thursday; and the only move was an improvement of ¼ in Alliance new. East London Water rose 2. Transactions were more evenly distributed on Friday; and everything was very strong, except Imperial Continental, which fell a point. Commercial old rose 2; ditto new, 3; and Gaslight 6 per cent. debenture, 2½. Saturday was quite unimportant; and quotations closed without further change.

ELECTRIC LIGHTING MEMORANDA.

The Parliamentary Electric Lighting Notices—The Period of Repayment for Electric Lighting Loans to Local Authorities—The Competition of Municipal and Commercial Electric Lighting—Mr. Ferranti Tells the Truth about Central Station Lighting.

THERE is a fair, but not a large or important, crop of notices of intended applications to the Board of Trade under the Electric Lighting Acts for the ensuing session. The number of notices is, indeed, slightly less than that of last year; and in no instance does the prospective undertaking involve a heavy capital outlay. Applications by local authorities figure largely in the list; the exploitation of electric lighting by private capitalists having almost entirely gone out of fashion. It would hardly be worth while to form companies for most of the electric lighting schemes contemplated by local authorities; and those electricians who have looked forward to a day of bigs things in this line, must ere now have become resigned to their disappointment. It is true that the electric lighting industry in the United Kingdom is in the aggregate a large business; but, with a few exceptions, the emoluments to members of the profession are annoyingly small. This, of course, means simply that the electric lighting engineer is a caterer of a luxury which shows no signs of coming into anything but strictly limited demand; and it also means that his own circumstances cannot be particularly luxurious. It is not likely that those parents and guardians who fall into the traps laid for them and their charges by premium-hunting electricians are habitual readers of parliamentary notices; but it would be a good thing if those who are attracted into this career by the delusive promise of its offering a "gentlemanly occupation" for ingenious yet genteel youths, could be brought to learn the particular lesson for them which is hidden in these meagre notifications.

An interesting portion of the business transacted at the meeting of the London County Council on the 20th ult., had reference to the vexed question of the "life" of electric lighting plant. The attention of all who may be concerned with the assessment of electric lighting stations may be directed to these proceedings. The Finance Committee of the Council reported upon the question of the periods for the repayment of loans obtained by vestries and local boards for electric lighting purposes; recapitulating the history of the matter, and stating its present condition. The local authorities who have applied to the Council for these loans have endeavoured to procure them for the longest possible time; and the Council agreed upon 42 years as the proper period, notwithstanding the fact that the Finance Committee considered that repayment should have reference to the life of each portion of the works upon which the money was to be expended. When the subject was laid before the Treasury, it turned out that the view favoured by this superior authority was that of the Committee, and not that of the Council. The Treasury ruled that no period for repayment should be granted which was disproportionate to the life of the works—which was tantamount to ordering that liability for present needs should not be laid upon the ratepayers of the future. Consequently, it became necessary to estimate the probable life of different portions of central station plant in greater detail than had ever been done before; and the result is now made public property. The most temporary of all electrical plant to which capital may properly be applied is meters and connections, which are only expected to last five years. Storeage batteries are taken to last eight years; arc lamps and cooling apparatus, ten years; boilers and covered mains, fifteen years; engines and dynamos, twenty years; culverts and bare copper mains, forty years; and buildings, sixty years. The Committee average these estimates in two divisions, and recommend the adoption of two periods for loans for the initial cost of electric lighting—namely, fifty years for all outlay upon land, buildings, culverts, bare copper mains, and patent royalties; and twenty years for expenditure for all other purposes. This recommendation has been approved by the Treasury, and adopted by the Council.

The importance of the subject of the foregoing paragraph can hardly be overrated, bearing as it does upon the most vital points of municipal electric lighting undertakings. Over and over again, the St. Pancras Vestry, and other similarly situated local authorities, have put upon record their opinion that it is of the first importance that the burden of repayment of money borrowed for electric lighting purposes should be made light, by spreading the process over a prolonged period. They have disputed the right of superior financial authorities to take cognizance of the purposes for which such money is required, inasmuch as loans of the kind are secured upon the rates, not upon the works executed by their aid. The decision of the Treasury and the London County Council will be a severe discouragement to those rash partisans of municipal electric lighting who would lighten present responsibility for such ventures, by involving the ratepayers of the future. Electric lighting companies, on the other hand, will rejoice at it, as limiting the advantages claimed for a municipalized service to those legitimately proceeding from administration and management. There are places, like Leicester, where the municipality is peculiarly well circumstanced for carrying on an electric lighting undertaking economically. What is complained of by the commercial electric lighting interest is when a municipality endeavours to make an unfair showing of economical working by dragging in its special advantages in regard to capital. This will now be put an end to; and the commercial interest will be to this extent gratified.

Mr. Ferranti has been lecturing, before the Royal Scottish Society of Arts, in the capacity of a candid friend of electrical industry; and he took the opportunity of telling some home truths respecting it, which will not be greatly relished by time-serving "experts" and touters after consulting fees. With regard to electrical heating and cooking, and to electromotive power and traction, Mr. Ferranti said that electricity is at present too dear to admit of the general adoption of these developments. This consideration of cost was the burden of the whole lecture. Electricity is too dear for use in any other way than for lighting; and even this must be confined to the best streets and finer public buildings, shops, and better-class residences. So that the present movement has a limit very soon reached, beyond which the demand for electricity cannot increase unless the cost is substantially reduced. Nor is there much present hope of this; for although Mr. Ferranti has dreamt as much as anybody about the future of cheap electricity, he is constrained to admit that for the present engineers must go on as they have been going. Nothing more is to be expected from the steam-engine. There may be something to come from the gas-engine. Mr. Ferranti thinks there is; but he evidently does not know how to get at it. As to central stations, the same undeniable authority declares that electricians find themselves in a "No Thoroughfare;" for the familiar obstacle of the load-factor bars the way to commercial prosperity. He thinks such establishments cost a great deal too much money, for which the consulting engineers are chiefly responsible; and the circumstance that these gentlemen are now mainly employed by municipalities lies at the bottom of their extravagance. There is reason in the opinion that if the purely commercial instincts of electric lighting companies had greater scope, the cost of central stations and their equipment would be vastly reduced. Mr. Ferranti had nothing to say about storeage, which is significant. It is the only conceivable remedy for the difficulty of the load-factor; but evidently Mr. Ferranti has no expectations in this direction. We agree with an electrical contemporary that such lectures, coming from a thoroughly practical engineer of large experience, are most valuable, and are infinitely to be preferred, in the public service, to "those optimistic speeches raving about electricity as 'the poor man's light,' 'the harnessed giant,'" and so forth, "commonly delivered before corporations and others by the expectant consulting engineer" (F.R.S.?)

A Prize for a New Incandescent Gas-Burner.—The list of prizes offered for competition by the Committee of the Société Technique du Gaz en France, which appears in the current number of the *Journal des Usines à Gaz*, contains an item of special interest at the present time. It is a prize of £400, to be awarded in whole or in part, to the inventor of a new incandescent gas-burner presenting some marked superiority over the burners now in existence. The burner is to be sent in before the 1st of April, 1895; but the Committee will determine whether or not they will extend the time till the 1st of May, 1896.

The Competition of the Welsbach Burner with the Electric Light.—Mr. E. M. Highlands has been enquiring, in *Electrical Engineering*, how electric light suppliers are to meet the competition of the Welsbach burner, satisfy their customers, and bring profit to their stations. He points out that a pound of coal will produce a light of 59·2 candles by electricity, and one of 80 candles if converted into gas, and consumed with a Welsbach burner. He then goes on to show that an electric light plant having a capacity of 2000 16-candle power incandescent lamps and 275 2000-candle arc lamps corresponds to a gas-works making 23 million cubic feet of gas annually. The cost of the two plants would be about the same; but the labour in the case of the electric lighting works would come to $455 per month, whereas for the gas-works it would be only $240. In the matter of depreciation, a gas company charges 2½ per cent., as compared with 10 per cent. charged by the electric lighting companies. Summing up the advantages of the two illuminants, he says that, though electric illumination is free from smoke and heat, and, with central stations, can be supplied in outlying areas at less first-cost than gas, the latter can be so made as to give 74 per cent. more light than electricity per pound of coal, while a saving of 50 per cent. can be effected in salaries, and 80 per cent. in repairs and depreciation, and the same mechanical efficiency secured whether working at full, half, or quarter load. Electricity is now being sold as cheaply as possible, with present machinery; whereas gas can be sold at less than current rates, and still leave a good margin for the shareholders. In face of these facts, Mr. Highlands is desirous of knowing how electric companies can best meet this competition.

The Lighting of Public Thoroughfares.—As bearing out some remarks recently made in our columns when referring to the superior lighting effect of Paris streets compared with the majority of the thoroughfares of most large English cities and towns, we quote the following paragraph from the *Globe* (London) newspaper, headed "La Ville Lumière." Our contemporary says: In the Christmas number of "Harper's Magazine," Mr. Richard Harding Davis has an article on "The Show Places of Paris," parts of which, by reason of the contrast they draw between French and American manners and morality, are calculated to make Frenchmen, and particularly M. Max O'Rell, "sit up" very high indeed. We do not know that Mr. Davis's deductions are correct; they were not always so in the case of certain English scenes which he described. But at any rate he is an exceedingly observant person, as is proved by another portion of his article. There is no doubt that Paris owes a good deal of its attractiveness to the fact that it is so brilliantly lighted. The Parisian, says Mr. Davis, "raises ten lamp-posts to every one that is put up in London or New York; and he does not plant them only to light some thing or some person, but because they are pleasing to look at in themselves. It is difficult to feel gloomy in a city which is so genuinely illuminated that one can sit in the third-storey window of a hotel and read a newspaper by the glare of the gas-lamps below." In what London hotel could this be done? With us certain streets are for a short time in the evening well-lighted enough. But this is not due to the generosity of the Vestries, but to the enterprise of private shop-keepers. This is easily proved by the darkness of the streets after the shops are shut. Driving home after the theatre, one hardly ever traverses a well-lighted roadway for more than fifty yards at a time. Of course, it would cost more to double or treble the number of lamp-posts; but we are not by any means certain that the expense would not be recouped. It was said at the time of the murders in Whitechapel that they could never have been committed if that part of the town had been better lighted. Illumination is certainly a foe to crime. It offers, moreover, a considerable inducement to travellers. We have no doubt that Mr. Davis is right in saying that "it helps to attract people to Paris, who spend money there; so that in the end the lighting of the city may be said to pay for itself." Let our local authorities take the hint.

PREPAYMENT GAS-METERS AS SANITARY APPLIANCES.

At the recent Congress of Hygiene and Demography held at Budapest, a paper by Sir Douglas Galton, on the warming of dwelling-houses, with special reference to central station heating arrangements, was read by Mr. John Slater. It has already been argued in the JOURNAL that the present primitive method of heating houses in densely-populated town areas by separate fires, involving a multiplicity of chimneys, must sooner or later give place, even in England, to some more systematic plan; and that the claims of coal gas to play an important part in connection with any scheme of improvement in this regard must not be overlooked. In so far as Sir Douglas Galton's paper is a contribution towards the formation of sound public opinion upon the essential principles of house warning, it is worthy of some attention. Unfortunately, the paper itself is padded out by the insertion of a quantity of superfluous matter, which is prejudicial to its effect as a whole; but it nevertheless contains some useful observations on the general subject, which is of sufficient intrinsic importance to engage the untiring study of all who have at heart the welfare of town populations. It is satisfactory to know that the London County Council are alive to the necessity of securing a sufficiency of light and air in and around the dwellings of the people, and are bent upon securing legislative sanction for a number of hygienic regulations having this object. It is something that instructed public opinion is coming to see—what has been asserted more than once in these columns—that the erection of so-called improved artizans' dwellings in crowded neighbourhoods has a tendency to increase the gloom of such localities; and in time it may become understood that the abolition of separate chimneys is the necessary complement of the steps that have already been taken in the direction of the improved housing of the poor in towns. There are large areas in London, to say nothing of other places, where one of the immediate consequences of the improved industrial dwellings movement has been the conversion of streets into the semblance of alleys wholly insufficient to circulate the quantity of fresh air necessary for the health of the crowded population, while such air as there is in the narrow gangways is darkened and polluted by the continuous smoke from tenfold the number of chimneys that once existed in the district. These places cry aloud for the relief which the "penny-in-the-slot" gas-meter is fully qualified to supply; and if the gas companies which have an opportunity of making friends with the artizan population through the agency of this appliance only rise to the occasion, more will be done towards purifying town air than legislation could effect in a generation.

Sir Douglas Galton, in company with most professed sanitarians, fails as yet to perceive the possibilities of improvement here indicated; and thus he devotes the greater part of his paper to the discussion of the problem of warming as presented by dwelling-houses of comparatively large size. Comparing coal-fires with gas, he remarks that the former requires fuel to be continuously supplied in the room by manual labour; and the rooms heated by this means are entirely self-dependent. On the other hand, a gas-fire also furnishes radiant heat. "It is supplied with fuel brought from a central source of supply. But the products of combustion from a gas-fire are comparatively cool, and do not produce the same velocity in the chimney which a coal-fire produces; and instead of favouring ventilation, it tends to cause the dispersion of those products in the room." This statement strikes us as not quite accurate. Most gas-fires are fitted into a chimney; and most chimneys have an up-draught at all times, whether or not the products of a fire are passing into them. If a chimney has a bad draught, or none at all, even under the additional motive power supplied by a gas-fire at the bottom of it, it could hardly be satisfactorily used for a coal-fire. In another place, Sir Douglas Galton returns to the charge, saying that "gas-stoves are convenient, in that the fuel is supplied without trouble; but the low temperature of the gases in the chimney favours the occurrence of back-draughts." To this it might be replied that coal-fires do not always burn with such intensity as to defy back-draughts, and that a chimney which is liable to give trouble with a necessarily fluctuating coal-fire is often good enough to serve for an equally-burning gas-fire. Sir Douglas Galton admits gas among the means whereby a combined system of heating many houses from one central source can be arranged.

With regard to the steam-heating central stations of the United States, Sir Douglas Galton remarked that the system is more especially applicable to countries where the winters are uniformly and persistently cold. In England, the variations of temperature are so frequent and rapid, that while much heat is required at one part of the day, at another time this is not the case. Consequently, the frequent changes would make it difficult to provide economically for heating over a wide area. Thus the only system of heating from a central station other than by gas which has proved practicable anywhere is inapplicable to the conditions prevailing in Great Britain. Yet, on a review of the whole question, Sir Douglas Galton thinks it is evident that much advantage to the population in a town would result from a central source of heat, without the inconvenience of having to carry fuel to every house. In a moderate-sized house, the coal consumption is estimated at 20 tons a year—surely, a high figure—and Sir Douglas Galton lays stress upon the labour of lifting the 2000 scuttlefuls which this quantity means, when converted into the common domestic unit, and the toil and dirt of carrying away the ashes. In artizans' houses, the saving of trouble by central heating would be great. All the same, Sir Douglas Galton admits that, as steam is not available for this service, at any rate in England, there is nothing to be done but invoke electricity or fall back upon gas. Naturally, being a man of science, he prefers the former as being "most manageable and most hygienic." Unfortunately, however, it is extremely expensive; so that gas remains in possession of the field. Sir Douglas Galton's paper was followed by one contributed by M. Trélat, who, oddly enough, confessed himself an admirer of English open fires, "which cast through the dwelling the bright perspective of brilliant combustion, and afford the delightful convenience of immediately warming one or more of the members of the body on getting home on a cold night." During the discussion of these papers, Herr Frederick Siemens spoke, and subsequently introduced to the Congress his own system of gas heating by means of stoves embodying the principle of the recuperative gas-burner, to which reference was made in a paragraph in the last number of the JOURNAL.

It is eminently desirable that there should be the greatest possible amount of discussion of the subject of the warming of dwelling-houses by improved systems; because all such debates end in fresh admissions of the fact that the only possible substitute for coal for this purpose is coal gas. On the occasion now in question, Sir Douglas Galton concluded with the familiar declaration that some cheap form of gas is best adapted for general use as a domestic heating agent. But this opinion is only the half-way house to the acceptance of ordinary coal gas as the *desideratum*. Once get it acknowledged that the fuel of the future—nay, for the immediate present—in towns must be gas, it is easy to show that the "cheap form" of gas which first recommends itself to hygienic reformers is a figment of the imagination. It is hardly too much to say that if gas, as at present sold for all purposes of lighting and heating, is not suitable for the applications Sir Douglas Galton had in view, neither it nor any other kind of gas ever will be. We lay stress upon this point, because there appears to be too much tendency on the part of professing hygienic reformers to prophesy good things to be done by fuel gas in the undated future, whereas the things can be had now for the asking. But it is not in houses where the consumption of coal is about 20 tons yearly that gas is likely to be best appreciated, either now or at any future time. Such a house implies a cook and several other servants, and a householder with an income sufficiently large for him to disregard small economies. Nothing less than an Act of Parliament would be efficacious in inducing such a householder to go without his smoking, blazing coal fire, if he had a fancy for it. Very different is the case of the artizan, who is now taking to gas with avidity, whenever and wherever he can get it by means within his compass. The fallacy of a special cheap gas supply is very apparent in this connection; for nobody would think of laying on two different kinds of gas to a cottage or tenement. Something that answers for fire and light as well is obviously what the poor man or the poor man's wife needs; and it is present in the popular pennyworth of coal gas. It is not necessary to ask an artizan to deliberately use a gas-fire instead of coal. This would be to go upon the wrong tack. The right way is to give him a gas-stove sufficient for the work of his small establishment, and a lighting burner or two; and then the smoky coal-range will not be lit very frequently. This is a practical reform which there is every reason to hope will realize itself in an ever-swelling volume, while hygienic congresses are only talking about what may happen in the dim and distant future.

It is at least possible to say, what could not be said a year or two ago, that gaseous fuel is making its way rapidly among the poorer classes of the community; and this by virtue of a very slight alteration in the arrangements for its sale and delivery. So civilization advances by ways which open out where least expected, while the professional prophets stand aloof, and look into vacancy for a deliverance that never appears from the most antecedently probable quarter. Five years ago nobody could have believed, if anybody had been found bold enough to say, that the most promising means of suppressing the smoke nuisance would be forthcoming in a small addition to the common, much-abused gas-meter. There was no apparent connection between the two ideas of gas measurement and the supplanting of coal-fires by gas-stoves. Nowadays the connection has been established; and the unforeseen has become the commonplace. Wherefore we say that it will be well for our sanitary reformers if they will forthwith come down from the heights where nobody lives, and lend their aid and countenance to a movement which, albeit not of their starting, is likely to further their desires amazingly.

The Heat of Combustion of the Principal Gaseous Hydrocarbons.—MM. Berthelot and Matignon have been experimenting with their calorimetric bomb, containing compressed oxygen, upon hydrogen, carbon monoxide, marsh gas, ethylene, ethane, propane, allylene, propylene, and trimethylene. According to the author's figures, as given in the *Bulletin de la Société Chimique de Paris*, the difference of the combustion-heats of homologous carbides is approximately constant, and close upon 157 calories.

NOTES.

The German Standard of Light.

The fifth annual report of the German Imperial Physico-Technical Institute has just been published. Besides other work, the Institute has conducted many investigations into subjects connected with thermometers, pyrometers, standard Hefner-Alteneck light-standards, and the photometry of lights and lighting. The chief optical work of the Institute was in connection with photometry. As regards the introduction of the amyl-acetate lamp to give the standard of illumination, the report claims that Germany is ahead of other countries in possessing a well-authenticated standard of light which answers all technical requirements. Recently the Institute has endeavoured to construct simple and portable photometers for technical purposes. Two such instruments have been constructed, and found to work well. By this means, the Institute has undertaken the photometrical testing of the electric arc lamps used in the chief thoroughfare, "Unter den Linden," in Berlin. It is a pity that the report cannot explain why the amyl-acetate standard of light remains a German speciality; and if the standard and the photometrical apparatus employed by the Institute are so completely satisfactory, it is to be desired that the Institute should send a competent representative over here, with samples, to assist our own Board of Trade Standards of Light Commission in their apparently endless deliberations.

Phosphorescence and Fluoresence.

Now that it is generally understood among physicists and chemists that the "light of the future" may turn out to be something in the line of phosphorescent or fluorescent matter, it is interesting to ascertain what these terms mean, on the authority of Professor Dewar, who has so deeply studied this order of phenomena. In a paper recently communicated to the Chemical Society, Professor Dewar observes that phosphoresence and fluoresence are terms applied to similar phenomena which apparently differ only in degree—the first lasting for a relatively long period after the withdrawal of the light stimulus, whereas the latter is so short that it can only be observed during the continuance in action of the exciting agent. In all cases, the luminous effects known by these names belong to a less refrangible part of the spectrum than the exciting rays. Phosphorescence may, Professor Dewar remarks, be regarded as a kind of fluorescence which lasts a long time after the excitation has ceased, and may be briefly defined as the phenomena observed when certain substances give out light through the transformation of absorbed vibrations of shorter period. It has been shown by Becquerel that the intensity of phosphorescence depends directly upon the intensity of the stimulating light, and on a factor of absorption and intensity as some coefficient representing molecular friction or damping. According to this, it would seem that the luminous effect of phosphorescence can never attain to the value of the exciting cause. Professor Dewar has found that temperature has a great deal to do with the actions in question; but he admits that many quantitative photometric measurements must be made before the actual changes taking place in the conditions governing the phenomena can be definitely stated.

The Increase of Damage by Lightning.

The Director of the Statistical Office of Berlin has been lecturing on the increase of damage by lightning, and on the effect of lightning discharges upon the human body. This authority explains the increase, which is undeniable, by referring to various causes; included among them being the employment of electricity in various industries, and the impurities introduced into the atmosphere by the growing consumption of coal. Professor von Bezold has shown, in the case of Bavaria alone, that for every fire caused in this country by lightning fifty years ago there are now ten. The increase in the number of fatalities due to the same cause, although evident, is not so large. It is noteworthy that persons struck by lightning generally perceive neither lightning nor thunder, but have the idea of being suddenly enveloped by fire. No comparison is drawn between the nature of the experiences of persons struck by lightning and those injured, fatally or otherwise, by stray currents of artificially generated electricity. If industrial electricians are chargeable with bringing down more fire from heaven than formerly descended upon the dwellers on earth, it is greatly to their discredit, seeing how much mischief they do at the same time by their own mundane apparatus. In the interest of modern civilization, however, if they could always be sure of protection from the latter, people would be content to run the former risk.

The Crystallization of Carbon.

The search of the mediæval alchemists after the secret by which it was supposed that baser metals could be transmuted into gold, is paralleled in the present day by the struggles of certain experimenters, among whom M. Moissan must be included, to effect the crystallization of carbon—*i.e.*, to make diamonds. The agent employed in these attempts is the electrical furnace; and the raw material is either gas coke or charcoal. Many interesting and instructive results have been attained by these workers; but, so far, no diamonds worthy of the name. Indeed, the modern quest for artificial diamonds seems to be very similar in its general results to the search for artificial gold, inasmuch as, though barren as regards its chief end, it is fruitful of some incidental discoveries in chemistry and metallurgy. The difficulty that stands in the way of the direct production of the diamond in the electrical furnace is that the raw material volatilizes, or sublimes, when sufficiently heated at ordinary pressures—the deposit being in the form of graphite. There is no evidence whatever of the liquefaction of the carbon at any temperature. For instance, the lid of a carbon crucible did not adhere to the body when the whole had been converted into graphite, nor did a carbon needle in a carbon tube in any case become united with the latter. Previous experiments have shown that, under great pressures, carbon may be fused; and diamond is then formed. The trouble evidently is to combine these two effects, and so revolutionize the diamond market. It is open to doubt whether this result is worth the effort that is being expended to procure it.

The Puzzle of the Cathode Rays.

M. Poincaré has summed up in the *Revue Générale des Sciences* all that is known concerning the nature and properties of the cathode rays which are produced in vacuum tubes. Professor W. Crookes was the first discoverer of these rays, which exist in the almost completely dark space that surrounds the negative electrode in a vacuum tube. In this space, rays were detected capable of impressing photographic media, of rendering phosphorescent bodies luminous, and of producing various calorific and mechanical effects. These were the cathode rays. More recently, M. Lenard, experimenting upon these rays, found it possible to make them leave the vacuum tube, and penetrate to the outer air through a platinum diaphragm. The result is of the first scientific importance. The fact that the cathode rays can propagate themselves in air at the ordinary pressure, and can also propagate themselves in an absolute vacuum, raises the hypothesis that in them we have a phenomenon of the ether itself. The rays do not propagate themselves in a straight line, but actually turn round opaque bodies; this is another important fact. M. Poincaré thinks these new phenomena are fatal to Crookes's theory of radiant matter. It is very remarkable that the media, such as gases, which are found to disturb the cathode rays, do so in the order of their densities alone. There is nothing corresponding to this with ordinary light; and there is the further puzzle that, whereas the rays can only be produced in rarefied gas, they are propagated in ordinary air. M. Poincaré asks what is the meaning of these remarkable conditions; and he holds that these questions touch the inner mechanism of luminous and electrical phenomena.

The Pitting of Iron Plates.

An investigation into the causes of the pitting of boilers has been concluded by M. Olroy, a French Engineer. He finds that this destructive action is likely to occur if a water very free from lime is used in a clean boiler. The pits take the form of conical, or more frequently spherical, depressions, filled with a yellowish-brown deposit consisting principally of iron oxide. The bulk of the powder being greater than that of the oxidized metal, it forms a blister, which was a skin as thin as an egg-shell. This skin varies greatly in toughness, and is formed mainly of iron oxide and lime salts. Feed heaters often pit badly, especially near the cold-water inlet. Perfectly pure water containing no air is quite harmless; and so is steam, unless it is mixed with air. The Loch Katrine water of Glasgow, which causes pitting in clean boilers, contains much gas. MM. Scheurer-Kestner and Meunier-Dolfus once placed a polished bar of iron in water containing much oxygen and no lime salts. The bar gradually rusted; but this ceased when the oxygen had been used up. Repeating the experiment in a water containing lime, the corrosion was far less, owing to the lime salts forming a protecting layer on the iron. In distilled water, the iron remained quite bright. Corrosion of iron goes on much more rapidly in water if carbonic acid as well as oxygen is present. In such a case, voltaic action ensues. For this reason it is essential that all traces of iron peroxide should be cleaned from the metal, or rusting will continue.

A New Hydrocarbon.—M. Adolphe Renard has, it is reported, discovered a new hydrocarbon in pine tar. It boils at from 250° to 280° Fahr.; and, when rectified, it is a colourless liquid boiling at 254° to 257° Fahr. Its specific gravity at zero is ·9419. It has no action on polarized light. Its analysis and vapour density give figures corresponding to the formula $C_{14}H_{22}$.

The Gaseous Products of Wood Charcoal.—M. Desmond has been investigating the subject of the gaseous products evolved from wood charcoal when submitted to a high temperature with the exclusion of air. He has found the mean percentage composition of these products to be as follows: Carbonic acid, 9·14; oxygen, 0·26; carbon monoxide, 18·08; hydrogen, 49·11; marsh gas, 16·04; nitrogen, 7·37. Hence the reaction $C + CO_2 = 2CO$, hitherto admitted as the expression of the truth, is much more complicated than the above formula indicates. The wood charcoal which has undergone the operation burns without odour or smoke, and is in some cases preferable to ordinary charcoal. The antiseptic properties of the gaseous mixture are superior to those of carbon monoxide.

TECHNICAL RECORD.

MANCHESTER DISTRICT INSTITUTION OF GAS ENGINEERS.

The Discussion on Mr. Fletcher's Paper.

We complete to-day our notice of the proceedings at the meeting last Saturday week of the Manchester District Institution of Gas Engineers, by giving a report of the discussion that followed the reading of the paper by Mr. A. T. Fletcher, Assoc.M.Inst.C.E., on "Inclined Retorts at the Leigh Gas-Works" (*ante*, p. 1020).

The PRESIDENT remarked that the paper was a very practical one; and he trusted it would receive adequate discussion.

Mr. ISAAC CARR (Widnes) said the members must all feel indebted to Mr. Fletcher for having come forward, at such short notice, with so practical and interesting a paper. Of course, the paper reflected in a measure the haste with which it had been prepared; for if Mr. Fletcher had had more time, he would no doubt have given them a little more detail, as the value of a paper of this kind lay in the comparative results it contained. Mr. Fletcher stated the cost of carbonizing by the new process and by the old; but he left out many items which required to be included before a fair comparison could be made. He (Mr. Carr) referred to interest on capital and other incidental charges which followed on a system of this kind. On one point especially he would like information. The distance between the two retort-benches was, Mr. Fletcher said, 16 feet. Had he ever had the two benches working together; and, if so, what was the temperature of the atmosphere when they were so working? He (Mr. Carr) had never been between benches of inclined retorts where both benches were working. But he had had experience of the working of one bench; and it was as much as he could do to stand the heat. It appeared to be one great drawback to inclined retorts that, where the benches were put back to back, the workmen had to suffer great hardship through excessive heat.

Mr. T. N. RITSON (Kendal) agreed with Mr. Carr that a few additional figures were required to make the paper complete. Mr. Fletcher said the cost of carbonizing was 1s. 4d. per ton; and assuming that he made something like 10,000 cubic feet per ton, the cost per 1000 cubic feet of gas was certainly lower than they had been led to expect from the regenerative system and machine charging. As he contemplated making some alterations at his own works, he had been much interested in the paper, and particularly in the statement as to cost. Another important point in the paper had reference to the clinkering, as to which Mr. Fletcher stated that it only required to be done once in three or four weeks. That was a very important consideration, as he thought they all agreed that the clinkering part of a stoker's work was perhaps the most arduous. He (Mr. Ritson) would like to know what extent of headroom was necessary between the top of the retort-bench and the tie-rods of the principals, in order to afford sufficient area for the working of the apparatus.

Mr. W. W. HUTCHINSON (Barnsley) suggested that the author should define what he meant by the word "clinkering;" it was hardly possible that he was using the word in the ordinary sense. He (the speaker) had never come across any form of generator regularly fired and in use where the clinker was not removed at much more frequent intervals than three or four weeks. In ordinary circumstances, the amount of ash accumulated in that time would be very heavy indeed.

Mr. T. DUXBURY (Darwen) said the reason given by Mr. Fletcher for adopting inclined retorts differed from those usually advanced. In most cases in which inclined retorts had been brought into use, the reason given was that unskilled labour could be used, instead of what was to some extent skilled labour—that an ordinary man out of the yard could attend to inclined retorts, whereas he could not deal with horizontals; and another reason given was that inclined retorts were preferable to having machinery for charging and drawing. But Mr. Fletcher appeared to have gone on another line altogether. He seemed to have adopted the system solely because he was short of space in the retort-house. As to the clinkering, he (Mr. Duxbury) confessed he was surprised at Mr. Fletcher's statement; that was, he thought, the most startling statement in the paper. They all knew that the quality of the coke made a wide difference so far as clinkering was concerned. With some of the coke they were now using at Darwen, with regenerator settings, they had to clinker twice a day. At other times the clinkering was not done more than once in three or four days—it sufficed if they simply "tickled" the bars occasionally. He would also like to know from Mr. Fletcher what the men thought about the inclined retorts. Was the work not much hotter and more laborious than with horizontal retorts? In this and other matters, they had, of course, to be guided, to some extent, by the convenience of the workmen.

Mr. W. S. HADDOCK (Warrington) asked if the £6506 given by the author as the total outlay included the coke plant, the raising of the roof, and everything.

Mr. W. CARR (Stalybridge) was pleased to hear that Mr. Fletcher had been able to obtain such good results with his inclined retorts at Leigh. It would have been interesting if he had given in his paper the quantity of gas made per ton, and the quality of the gas; also the kind of coal used. A good idea of the efficiency of the working could be obtained from such figures. Of course, the number of days he had had the retorts working—viz., 410—was not a long time; and he supposed they were as yet comparatively new. Had he noticed any alteration in their position after they had been working that length of time? He remembered that at Huddersfield some of the retorts had changed their positions, and got out of the true slope they were originally laid in; and the consequence of this was the coke did not come away as freely as it might otherwise have done—in fact, the retorts could scarcely be said to work automatically. The labour that the men had to employ to get the coke out was also considerable. He, of course, knew that horizontal retorts, when they became old, got a little bit wrinkled. They did not keep their true position, and were consequently more difficult to draw than new retorts. But he thought that the inclined retorts he saw at Huddersfield were affected more in that respect than horizontal retorts would have been. He wished to know whether this was inherent in the system, or whether it was merely a local fault. It was curious, he might here remark, to observe how discussions sometimes went off on side issues. Mr. Fletcher seemed to have attracted more attention by his remark on clinkering than by anything else; and he must certainly use marvellous material, if he only clinkered once in three weeks. But the main subject was that of inclined retorts. There was certainly an enormous difference between the 1s. 4d. and 2s. 7½d. per ton given by Mr. Fletcher as the cost of carbonizing under the old and new systems. But he (Mr. Carr) would point out that 2s. 7½d. was not very satisfactory working for the horizontal system; so that it was not fair to credit the new system with all the saving. Anyone who could not carbonize coal for less than 2s. 7½d. per ton was not working to the greatest advantage with the horizontal system. But 1s. 4d. was certainly a distinct gain on the best system of hand-firing with horizontal retorts. He regarded Mr. Fletcher's paper as a valuable contribution to the literature of coal carbonization, and heartily congratulated him upon it.

Mr. R. HERRING (Huddersfield) said he also could congratulate Mr. Fletcher on the system he had adopted for increasing the carbonizing power of his retort-house, as the inclined retort system no doubt gave a much greater production of gas for the area at command. With regard to the working of inclined retorts generally, there had been as many reports of failures as of successes; but he was satisfied that the failures were attributable to causes that could easily have been overcome. In many instances, the bracing of the benches was probably insufficient; and in still more cases failure had been due to proper care not being bestowed on the altered conditions of heating. Possibly the greatest failures were the original systems where they had a cast-iron shoot attached to the sloping retort. He thought that with taper retorts and stage-floor retort-houses, the system was almost as automatic as any system could be; and it was otherwise satisfactory. Last winter he had considerable trouble with his men. It was a new thing; and they did not take kindly to it. They tried to find out the strength of the machinery by putting in bits of iron, and crowbars, and things of that sort. But only the previous week, it was freely admitted to him that the men were less tired in working the inclined retorts. Mr. William Carr had referred to some of the retorts at Huddersfield getting out of shape. This was probably due to the fact that below the retorts there was 15 feet of new brickwork. However, fifteen of the settings were still working; and he thought would work for some time longer. It had been said that the men must be considered; but he (Mr. Herring) did not think the men need be studied to such an extent as was sometimes suggested. The men did not study the manager—in fact, he found that the easier it was made for the men, the more troublesome they became, as they had more time to think about what they should grumble at next. He quite agreed that, where it could be done, the work should be made easier; but it was not desirable that they should sacrifice efficiency for the sake of sentimental and sympathetic feelings towards the men.

Mr. JOHN WEST (on the invitation of the President) said certain of the points on which he wished information had been already referred to—viz., the make of gas per mouthpiece and the illuminating power. Mr. Carr had alluded to the quality of the coal used; and there could be no doubt the very best coal that could be bought was being used at Leigh. It was at all times necessary to be careful in making such comparisons. He (Mr. West) had been trying to work it out and to compare one system with the other; and he found that on the old system Mr. Fletcher was carbonizing 8 cwt. of coal per mouthpiece, and on the new system 15 cwt.; on the old system 2 cwt. of coal per six hours, and on the new 3¾ cwt. But it must be remembered that, without inclined retorts or anything of that kind, it was often possible to effect a great improvement by simply modernizing old works. The results with inclined retorts ought not to be compared with the results obtained at antediluvian works, but with results at the best works on the old system. He could have wished that the practical details—which were very interesting, as far as they went—had been a little more complete. Figures were given as to the cost of labour; but he supposed these did not include the cost of taking the coal to the retorts. Then there was the clinkering, which was put down at a marvellously low figure. He had been

all over the country very recently; and he had never come across any regenerator settings which would go three or four weeks without clinkering. The arrangement for conveying the coke away was, he thought, very good indeed; and there could be no doubt there would be a great saving in connection with that. Similar apparatus, but on a much larger scale, was being put up at Bury at the present time. As to convenience or inconvenience to the men, he was rather disposed to agree with Mr. Herring's statement that the lighter the work was made for them, the more time the men had to grumble. All the same, he believed that, from an engineering point of view, it was desirable they should make the labour of the men as light as possible, as in this way they would attract a much better class of men to the work. He had had experience of that in Plymouth, in spite of the trouble there—trouble that was quite outside ordinary gas making. He had just returned from there; and he found that the men who were working the machinery were a superior class of men. He gathered from the Manager that the men rarely absented themselves from work; and this might be regarded as the effect of lightening their labour.

Mr. W. Carr said there was one thing he would like to add to what he had already said. Mr. Fletcher mentioned, as a merit of the system, that when the coal was shot into the retort, it remained more solid and compact, and therefore the retort held more. The comparative makes of gas per ton of coal carbonized would have thrown some light on the effect of that. Many gas engineers thought the lighter they could make up the retorts, the more satisfactory were the results.

Mr. Herring, referring to the items to be included in taking the cost of labour, expressed his opinion that it would be better to make comparison on the actual work done—on the weight of material handled. If they compared on this basis, all questions as to rates of wages, and so on, would be eliminated.

Mr. Craven (Dewsbury) confessed that during his visits to places where inclined retorts were employed, he had not been favourably impressed by them—mainly on account of the intense heat, which must be very trying to the men. From his own experience, he thought that 2s. 7½d. per ton was an extreme figure under the old system; and if interest, wear and tear, and other charges were added to the £6000 odd mentioned by Mr. Fletcher, it would be found that the difference between the systems was not so very great.

Mr. H. Simmonds (Colne) said that, in respect to their increased demand for gas, Leigh seemed to have been in much the same position as Colne. During the last five years, the make of gas at Colne had increased to the extent of 52·5 per cent. A few years ago, he remodelled the works on the inclined-retort system. It was a single retort-house, with twelve benches of eight retorts; and he adopted that arrangement with the view of introducing West's manual machine, of which he had had previous experience at Cheltenham. Putting the machine down on one side of the house, he found that it worked very satisfactorily. He would like to be informed whether Mr. Fletcher's figure of 1s. 4d. per ton of coal applied to the whole year, or whether that was the lowest. At Colne, at the present time, they were carbonizing at about 1s. 4d. per ton; but in the summer it would run up to 3s. per ton. Taking last year and the previous year, they came out at about 2s. per ton, including everything. As to the clinkering, to which reference had been made, they did that about every three days. With regard to fuel, he was using 10 lbs. of coke per 100 lbs. of coal carbonized in the regenerator settings.

Mr. Fletcher, at the close of the discussion, said so many points had been raised, that he could only briefly reply to a few of them. He asked the meeting to remember that it was a paper on "Inclined Retorts at the Leigh Gas-Works." It only professed to be a description of what they had done at Leigh, and were doing now. As to the first point of which he had made a note—that of the temperature when both benches were working—he had not made accurate observations; he could only say that the heat was quite tolerable, although the distance of the retorts apart was only 16 feet—certainly not greater than it was when standing a similar distance from the face of ordinary horizontal settings. The fact that the heat was not greater was due, in his opinion, to the small mouthpieces without ascension-pipes on the drawing side, where there was not the same radiating surface as with ordinary horizontal retorts. Questions had been asked as to what the 2s. 7½d. per ton meant in connection with horizontal retorts. It meant the cost of all the labour in wheeling the coal from the store to the retort-house, drawing, charging, wheeling out the coke to the yard, and attending to the fires—the standard rate of wages in the district being each man to carbonize 2 tons for 5s., the additional 1½d. per ton being due to other retort-house labour. In like manner, the 1s. 4d. per ton for inclines included all charges connected with the handling of the coal from the coal-store onwards to placing the coke on the coke ground. It embraced all labour in connection with the coal and attending to the fires, including the clinkering, as to which he would say a word later on. The answer to Mr. Ritson's question as to the headroom required was that they had about 3 feet. Mr. Duxbury asked whether the men liked it. There could be no question that they did like it. They could do their work now in forty minutes each turn, whereas formerly it always took them an hour and a quarter. To show that the men liked them, he would mention that, if ever a man was off his work, there was a rush for his place; and all the oldest men wished to go on the inclines. In reply to Mr. W. Carr's question, they made—over the year—10,600 cubic feet of gas per ton; but, of course, they did not do so well when there was a dispute in the coal trade, such as there was last year, and they had to take what coal they could get. As to illuminating power, they made, on an average, 16½-candle gas from coal; but they made up with cannel, and sent it out at 18½ candles. With regard to the life of the retorts, they seemed quite capable of working another 410 days; there was nothing wrong with them, as far as he could see. He attributed this chiefly to the method of removing the carbon. Good heats, and the systematic removal of the carbon formed the secret of the successful working of inclined retorts. But in order to keep the retorts in good shape, they must be well stayed; and the internal vertical walls of the settings must be placed much nearer together than was usual in the case of horizontals. Mr. Carr had placed a wrong construction on what was said in the paper with reference to the charge lying closer together in inclines than in horizontals. He (Mr. Fletcher) did not mention this as a merit of the system, but as a fact; and he quite agreed with Mr. Carr that it was easier to carbonize coal when in loose charges than when it was more solid. At the same time the difference was really very slight; and no difficulty whatever was experienced from it. In reference to the amount of laborious work a man did for the 1s. 4d., he could easily deal with twice as great a weight of coal with less trouble to himself than when working horizontals. He did not lift any coal at all; the only things he had to lift besides wheeling out the coke were the tools, which were not large. The work took less time; and there was consequently less exposure to the temperature of the settings. In reply to Mr. Simmonds's questions, there was very little variation in the cost of carbonization; it kept pretty much to 1s. 4d. One point he desired to mention as showing the saving by inclined retorts, and it was this: In the winter time when the horizontal retorts were in use, they always found it necessary to have certain men in the works capable of stoking, who were not actually employed, to take the place of men who were sick or away from their work. But they were able to do without these men now, as any ordinary labourer could work the retorts. Then as to the clinkering. What he had stated was a fact; and it was a fact that did not apply to the inclined retort-settings only—they had done it for six years with horizontals. The state of things was due, in his opinion, to the method of attending to the fires in the first instance; and it was due also to this, that the fire-bars were 5 ft. 6 in. long, and the breadth of the furnace was 3 feet. They thus had considerable area under the bars. Then, again, the clinker that was removed, let it be remembered, was clinker—it was not ash. The ash was removed before it became clinker. The man who attended to the fires went to them every two hours, and gave a slight "wriggle" to each bar; and everything in the shape of ash that was lying on the bars came down, and so did not get made into clinker. For six years they had used steam underneath the bars; and that, he thought, was also of great advantage in preventing the accumulation of clinker. But, of course, if they did not do the "wriggling" business regularly, they would have to clinker about every three days.

Mr. T. L. Sheppard (Farnworth) proposed a vote of thanks to Mr. Fletcher for his paper.

Mr. George Smedley (Buxton) seconded the motion. He remarked that the paper had been a good one, although he must say that Mr. Fletcher had not yet converted him to the sloping retorts. He would require to see more of them working before he went in for them. As to clinkering, his (Mr. Smedley's) furnaces were not regenerative; he simply supplied them with secondary air. He had steam under the bars, as Mr. Fletcher had; and they did not think of clinkering their furnaces more than once a fortnight—in fact, the men would not do it. They merely adopted Mr. Fletcher's idea of "wriggling." The system he had indicated had been at work for the last ten years; and they were perfectly satisfied with it. He paid his men so much per 1000 cubic feet of gas made. It was 2¼d. per 1000 feet, which included all labour connected with the retorts, furnace cleaning, and everything. It came out at about 1s. 10¼d. per ton of coal carbonized, which was very moderate.

The President, in putting the motion, explained that the paper had not been volunteered, but had been prepared at the request of the Committee. Considering the busy time of the year, he must say it reflected great credit on Mr. Fletcher.

The vote was passed, and suitably acknowledged.

More Wide Tendering.—Since noticing the differences in the amounts of the tenders recently submitted for new pumping machinery at the Brighton Corporation Water-Works, to which reference was recently made in the Journal, our attention has been called to two other instances of wide tendering. For the construction of a large storeage reservoir, &c., at Redruth, seventeen tenders were sent in—the highest being for £14,215; the lowest for £7301, which was accepted. But, from what has lately transpired, it may possibly be annulled by a vote of the ratepayers. For the wiring of the Cardiff Market for electric lighting purposes, including the supply and fixing of all cables and accessories, but not lamps and fittings, one firm wanted £740, while another was willing to do the job for £198. To carry out similar work for the Town Hall, the highest tenderers asked £994; whereas another firm wanted £264.

AMERICAN GASLIGHT ASSOCIATION.

The Annual Meeting in Washington.

(*Continued from p. 971.*)

Mr. F. Egner read a paper on "Observations on Sundry Methods of Making Water Gas from Bituminous Coal." In the course of his introduction, he observed that good retort-house coke, weight for weight, was better than anthracite for water-gas generators; and it was only a question of cost which should be used. He had himself designed apparatus in which all kinds of gas coal could be successfully worked; but in the end he found it better to first convert the coal into coke in the usual way. The average result of one year's working, during which 89 million cubic feet of gas were made, was 30·2 lbs. of coke, 3½ gallons of Lima crude oil, and ¾ gallon of 63° gas naphtha per 1000 cubic feet of 21-candle gas. The make of gas per man was 87,600 feet per day. In his apparatus, the air, or steam, could be taken in at the top or at the bottom, as might be preferred. Several systems for making water gas from bituminous slack had been introduced from time to time. After describing a personal visit to one such process, he gave details of the apparatus used by the Cicero Gas Company, which comprised a double set of two vertical cylindrical generators 4 feet in diameter inside by 11 ft. 6 in. high; inclined D retorts, 22 feet long, 30 in. by 54 in. in section; and fixing chambers 7 feet diameter by 30 feet high. A single set could be used by itself; but the intention was to work the two together—the gas made in a down run in one set being passed up through the other, and *vice versa*. The double set covered a floor-space of 32 ft. by 45 ft.; required three men per shift; and it would easily make 400,000 cubic feet of gas per 24 hours. The retort was joined at the lower end to the generator, and at the upper end to the fixing chamber; and the coal was fed in at the top of the retort, and gradually passed down till it reached the generator as coke. The apparatus was worked in runs, in the usual way; and some special tests were made. It required 36 lbs. of Youghiogheny coal and 4·3 gallons of oil to produce 1000 feet of 26-candle gas; or 48 lbs. of Du Quoin nut coal and 4⅝ gallons of oil would yield equal results. This did not include fuel for raising steam. The gas-making runs averaged 8 minutes, and the blowing up somewhat less; while the fires were cleaned once every 12 hours. Attention was next directed to the operations of a large company near New York, making over 200 million feet of non-carburetted gas per annum. The apparatus comprised eight sets of generators, hydraulic seals, and multitubular condensers, by which sufficient heat was recovered to generate more than half the steam required. No air-blast was used; but the heating up was effected by drawing air down through the generators. Each set occupied a ground-space of 14 ft. by 9 ft. The generators were 6 ft. 8 in. inside diameter and 16 feet high; and each would easily make 300,000 feet per day, using a superior blacksmith coal that was largely employed for steam. The clinkering was done every 24 hours; and the results per ton of coal were 50,000 feet of water gas and 150,000 feet of inferior fuel gas, which was mostly consumed under the carburetting retorts. Oil gas was made in the old coal retorts—eight retorts being required for each generator—and mixed with the water gas at the inlet of the purifiers. Some of the retorts were still fired with coke, and would carbonize 7 gallons of oil per hour; but the gas-fired retorts would carbonize 9 gallons. The quantity of 70° naphtha used per 1000 cubic feet of 25-candle gas manufactured was 4·8 gallons; and including all labour up to inlet of the purifiers, the make was 81,500 feet per man. The make could be increased 25 per cent. by using anthracite or coke in the generators. Uncarburetted gas was now being made in many manufacturing districts, and adapted for lighting by means of the Welsbach burner; and the author considered this process to be the solution of the cheap fuel gas problem. By way of comparison, the author gave some figures showing the everyday working of an improved Lowe apparatus, comprising a generator 4 feet inside diameter by 13 ft. 9 in. high, a carburettor of similar size, and a fixing chamber 4 feet diameter by 20 feet high. The floor-space covered was 18 ft. by 50 ft. The average results of one month's working, at about 12 hours per day, was 1048 runs; gas made per run, 4714 cubic feet, and per hour, 12,754 feet—or 77,163 feet per man per day. The amount of coal used was 52·7 lbs. (including steam raising), and 4·7 gallons 70° naphtha, per 1000 cubic feet of gas produced; but if the apparatus had been fully employed instead of standing off half the time, better results would have been secured. By way of supplement, a table comprising the results obtained with eleven different processes was exhibited, giving pounds of coal, gallons of oil, illuminating power, and make per man. Mr. Egner said a great deal depended upon the skill of the operator. He had known one man to average 1 gallon of oil per 1000 feet less than another; and the apparent simplicity of water-gas making caused the very common and very costly mistake of employing the cheapest available labour to change the valves every set number of minutes. This also applied to the raising of steam, for which purpose anything from 6 lbs. up to 20 lbs. of fuel per 1000 feet of gas were used; and that was the reason why he had omitted reference to this item in his paper.

Mr. Addicks commenced the discussion by giving some results obtained with the Flannery apparatus, with which he was making 930 million feet per annum. He averaged 34·5 lbs. coal for the generator, and 12·6 lbs. of fuel for raising steam (the latter consisting chiefly of cinders from the generators, and including refuse, such as coke, that had been used in the scrubbers, screenings, shavings, &c.), also 4·7 gallons of naphtha per 1000 cubic feet of 25·7-candle gas produced. With regard to the variation in the quantity of fuel used for raising steam, it must be remembered that something depended on the climate. During frost and snow, large quantities of steam were used for keeping the water in the holder tanks, &c., from freezing. Mr. Loomis said that at Williamsburg water gas had been made during the summer for the total supply; and that last month's statement showed an average of 31 lbs. of coal in the generators, 9 lbs. for steam, &c., and also 4·8 gallons of oil per 1000 feet of gas made. Mr. Bowen said that, by the Rose process, referred to in the paper, good results had been obtained. An average of actual working showed 36 lbs. of Kanawha slack, 14 lbs. of coke, and 2⅞ gallons of naphtha per 1000 feet of 22·6-candle gas. He recommended soft coal; and said that gas must have a high heating power, if it was to give satisfaction. Mr. Shelton said that the make per man depended more on the size than on the form of the apparatus. At this point, a discussion arose as to whether some of the preceding remarks were not of the nature of advertisements; and a motion for the deletion of such remarks was put to the meeting, but was lost. Mr. Egner, in reply, remarked that the consumption of fuel for raising steam was also largely influenced by the form of boiler used.

Mr. C. H. Evans read a paper on "Petroleum and its Relations to the Gas Industry." He briefly noticed the history and theories relative to the formation of petroleum; and believed that the varieties found in Ohio, Pennsylvania, and New York were distinctly of vegetable origin, while those of California and Kentucky were of animal origin. The specific gravity ranged from 0·78 to 0·97; and it presented a fairly regular composition of C, 84; H, 14; and O, 2 parts. Twelve distinct hydrocarbons, all homologues of CH_4, had been found in it. There were about 30,000 wells in the States—some 2500 feet or more deep; and the yield varied from a few barrels up to 280,000 gallons per 24 hours. The ordinary life of a well was four years. The growth of the business had been phenomenal. In 1860, it was about 4 million; but in 1893, it had risen to 3400 million gallons, of which about one-fourth was exported. Petroleum was treated by fractional distillation, and yielded light fluids like gasoline, burning oils, lubricating oils, paraffin, and coke. The products most intimately concerned with the gas industry were those which showed a specific gravity ranging from 0·694 to 0·839. The most important item in the cost of carburetted water gas was the oil; and from inquiries made, he found a great variation—some works being evidently in a deplorable state, whilst at others the claim was too good to be true. The two extremes were 2⅞ gallons (0·811 sp. gr.) of crude oil per 1000 cubic feet of 22½-candle gas and 9 gallons per 1000 feet of 24-candle gas. It might be supposed that the gas-making properties varied as the weight, apart from the specific gravity; but this was not the case, as the heavier varieties gave a good deal of tar. The best plan for treating crude or heavy oils, was to run very high heats in the superheater; and to avoid back pressure. The fluid should be atomized to the highest possible degree when injected into the superheater; but not with steam (unless perfectly dry, and at a high pressure), as the water vapour tended to form carbonic acid. It had been suggested that hydrogen under pressure might be employed. The results of some experiments on Lima (O) crude, Northern (O) crude, and Ohio gas naphtha were next commented on. The quantity tested was a gallon, of 231 cubic inches, in each case; and the following are some of the principal results:—

	Lima.	Northern.	Naphtha.		
Specific gravity . . .	·839 ..	·811 ..	·768 ..	·745 ..	·694
Cubic feet of gas . . .	70 ..	73 ..	77 ..	81 ..	83
Weight of gas in pounds	6·53 ..	6·52 ..	6·13 ..	6·03 ..	5·67
Loss of weight „	0·46 ..	0·24 ..	0·24 ..	0·13 ..	0·11
Candle power	56·00 ..	54·00 ..	51·00 ..	47·00 ..	45·00
Enriching effect . . .	83·50 ..	82·00 ..	79·50 ..	78·00 ..	72·00

The photometrical value was taken from a 2 feet E. H. tip, using 2 cubic feet per hour; and the condensed matters were repeatedly returned to the retort, until no further condensation appeared. The enriching effect was ascertained by dilution with hydrogen; and this series of tests was made on account of the difficulty of properly burning such rich gases. The average increase of value was 56 per cent. Some practical results went better than these, which might be due to high heats. A high temperature, not too long continued, increased the enriching value by increasing the formation of benzole compounds; but too long contact with the brickwork, would burn the gas to lampblack.

Discussion being invited, Mr. Thompson asked for some information as to the fair yield of gas per gallon of oil by the retort process, for carburetting coal gas. Mr. Clark said that his practical results by the retort process were 70 to 75 cubic feet of 60-candle gas; and he would like to know the heat at which 70 feet of 83½-candle gas was obtained. Mr. Pearson, jun., said that the fuel value of tars from heavy oils should be considered. Two and a half barrels of tar were as good as a ton of coal; and using heavy oils, he was able to do with 30 lbs. of coal or coke, inclusive of raising steam, per 1000 feet of gas made. The relative cost in the first place should also be taken

into account. Mr. Egner said that, by the Pintsch process, Pennsylvania crude oil gave 70½ feet of 45½-candle gas per gallon; and a poor sample of the naphtha gave 51 feet of 46-candle gas. Lima crude oil yielded 63 feet of 56-candle gas; and the naphtha, 72 feet of 46-candle gas. The uncompressed gas was tested with a 2·4-feet burner for these results. Mr. Gartley said that the low consumption of oil in some cases might be ascribed to the use of soft coal, which supplied a part of the illuminants. Mr. Evans, in reply, said he saw no reason why the results he had obtained should not be equalled in practical working. The diluent he used contained 2½ per cent. of carbonic acid, without which his enriching results would have been better by some 3 per cent.

Mr. H. C. Slaney read an interesting paper entitled "One of the First Meter Makers in the United States," in the course of which he stated that the first Gas Company in America was established at Baltimore, in 1817. Boston followed in 1822; and New York, a year later. The manufacture of gas-meters was commenced in Baltimore between 1830 and 1840, previous to which meters were imported from England. The meters then cost about two and a quarter times the present prices. The author spoke highly of the early meter makers; pointing to the fact that many ancient meters were still at work, and claiming that the materials found in them were better than those used at the present time.

Mr. J. H. Lindley, of Ogdensburg, described a method of repairing or patching gasholders while in use. He takes strips of iron plate of suitable width; drills them round the edges, as for riveting; paints the side to go next the holder with a mixture of red and white lead; fixes the plate in the position over the faulty place; continues each hole through the old plate singly; taps the hole; and screws in a round headed screw. In this way, the patch is fastened on; the screws taking the place of rivets.

(To be continued.)

CORRESPONDENCE.

[*We are not responsible for the opinions expressed by correspondents.*]

Unaccounted-for Gas.

SIR,—The problem of what may be the true loss of gas between the station-meters and its multitudinous points of consumption, is one of the most tiresome that can be offered to a gas engineer for solution. It is not at all troublesome to standardize the registrations of the station-meters, as they are few in number, and are under the immediate control of the gas engineer. It appears to me, however, that the equally exact standardization of the registrations of the consumers' meters to standard volume offers almost insurmountable difficulties.

It is not convenient for one treating generally on a subject with only special reference to one specially studied case, to assume that there is generally any want of accuracy from avoidable causes in the registrations of the meters (either station-meters or consumers' meters) of gas undertakings in general. In these days of advanced and advancing technical knowledge, there can be no doubt that those responsible for the conduct of gas undertakings have taken proper means to verify the various measuring apparatus; and I have, therefore, felt it better in discussing this subject to assume that there are no more than trifling and unavoidable errors in the registrations of station-meters in general, and further that the control exercised by two opposite interests is sufficient to maintain the average registrations of the consumers' meters within proper limits of accuracy.

It is perfectly true that there are some cases of apparent anomaly; but these perhaps would be capable of explanation if all the details were known. It is also true that there have been cases—more or less widely known—where the gas sold exceeded the production; as also of station-meters that have, from various reasons, had unsound drums. But these are the accidents. One is reminded of the story of the old gamekeeper, when first asked to look into the breech of a new breech-loading gun. "Ha!" said the old fellow, startled with the sight of the glistening barrels, "If the masters could look down the old muzzle loaders like that there'd be some orful reverlashions." I hope that the day of "orful reverlashions" with regard to station-meters is long gone by.

In my own case, I carefully examined the station-meters with a test-meter that I had standardized against a test gasholder that had been also carefully standardized by the method of displacement with weighed quantities of water weighed against standardized weights; and as all the usual precautions had been observed, there is reason to believe that the value of the *registered* cubic foot was known in terms of standard cubic feet within a very trifling experimental error. A representative number of the consumers' meters had also been tested against a standard gasholder.

Of course, the station-meter may be perfectly adjusted; or, what is practically the same thing, its error may be known under testing conditions. But if at times of maximum production the meter be overworked, the difference between the mean water-lines on the inner and outer sides of the drum may be very important. The same remark applies to consumers' wet meters. I say "mean water-line," because under such circumstances the water surface is more like that of a raging sea than a line. There is also the difference between the artificial pressure at the one point of measurement and the others. By "artificial pressure," I mean that which is not due to the atmosphere.

To arrive at the *mean* temperature of the gas in the consumers' meter is the *crux crucis*. The estimated portion of gas—such as that supplied to the public lamps—does not present any great difficulty, as the estimate is under control. To attempt to arrive at the temperature of the gas in the consumers' meters by direct measurement is a task I shrank from as impracticable; and the case of one meter out of about 80,000 offered by Mr. Frank Livesey will not (unless he has from other considerations had reason to believe it to be an average case) materially help in the solution of the problem.

It is needless to point out the difficulty of obtaining the mean temperature of the gas in the consumers' meters for a number of cases sufficient to give a fair average. Feeling the practical impossibility of obtaining the mean temperature by direct observation, I adopted the inferential one mentioned in my recent article. Such a method may not, of course, recommend itself to every mind. It is simple and completely inexpensive, and has certainly yielded interesting information; though I frankly admit it has not given an absolute answer to the question, "What was the mean temperature of the gas?" I had, however, the results of the observations from over 6000 meters out of about 38,000; and, on tabulation and analysis of the results, I find them remarkably concordant among themselves. The results indicate that the water saturation of the gas is affected by the size of the meter and the velocity of the gas. I confess that, on scheming out the method, this result was not anticipated. However, it is well known that a slight oil-film has remarkable influence on the evaporation from a water surface; and it is a fact that the water in these meters was oily.

In treating this subject on general grounds, it must be noted that different towns may have distinctive peculiarities as regards the average situation of the consumers' meters. There are manufacturing districts, residential districts, &c.; meters in gardens, cellars, kitchens, boiler and engine houses—in short, in every conceivable situation. For that reason, I do not wish to suggest that the meter cited by Mr. Frank Livesey may not be a fair average case for the district he controls.

When I first began to study this subject, I estimated the true loss as about 65 per cent. of the unaccounted-for gas; later, by another estimate, at 75 per cent.; and now, from such examination of the results of the inferential method as I have been able to make, it appears to me safe to say that the bulk of the unaccounted-for gas (always, of course, assuming, as before remarked, the meter registrations to be reasonably correct) to be actual loss from the distribution system.

On taking the results obtained by testing newly-laid mains without service-pipes, by a method which it is true is not the same as that usually employed, but which appeared to me to offer some advantages, it was found that the loss under such circumstances varied from 0·32 to 0·79 cubic foot of gas per 1000 superficial feet of gas-main per hour per 10-10ths pressure. The unaccounted-for gas represented, however, as much as 2·08 cubic feet on the same basis. This for the whole distribution system with services, &c.

It is clear that the water-evaporation method does not, for the larger meters at least, give the maximum elevation of temperature; but does it not fix a minimum?

I am glad to see that Mr. Frank Livesey has been occupied with this question; and I hope that other eminent gentlemen may be induced to add any results they may have to the general store of information. I also hope that others more competent than myself in such matters may find the subject sufficiently interesting to be submitted by them to critical examination.

1, *Victoria Street, S.W. Nov.* 24, 1894. LEWIS T. WRIGHT.

A Danger of Modern Gasholder Practice.

SIR,—Your article entitled "The Danger of Modern Gasholder Practice" cannot be too widely known by the directors of gas companies and all those interested in the establishment or control of gas-works. I am in hearty accord with every word of it, and would re-echo the very sensible remarks of "A Provincial Nobody" on the same subject. Your note of warning has been given none too soon; for without doubt a most unhealthy condition of things now exists in all that appertains to the design and extension of the majority of gas-works.

It is no disparagement of the ordinary gas manager to say that he is not an engineer. A very small percentage of gas managers have ever been regularly trained as engineers; and, therefore, unless they have, it cannot be to the advantage of the Company to insist on their acting in such a capacity, or even to allow it, where large sums of money and the necessity for economical working are involved.

A mere copyist, or one who begs or accepts his designs from obliging contractors, cannot justly claim the title of engineer; and even if he is able to get the order placed with a contractor who will rectify and hide his blunders for him, he is surely not a fit and proper person to control or superintend the carrying out of the work.

The present system of dependence on contractors for designs, is hurtful in every way to the company permitting it. We have read the letters from Mr. George Livesey and Mr. Hunt on the "combinations" existing between contractors, for wresting high prices out of gas companies. Surely this alone should make the directors of companies wary of putting themselves still more in the power of such "combinations," by depending on them for designs—whether it be through the manager or not.

It is only reasonable to suppose that, when a contractor has obliged a gas manager with designs, that the "ring" would see that the order falls to that particular contractor at his own price. Undoubtedly it is a great temptation for a gas manager to pose as an engineer when the contractor offers to do everything for him without any trouble to himself. He may even, for the mere asking, be glorified by having his name cast in bold letters, as the engineer, on the gasholder columns; or else a glowing record may be inserted in the JOURNAL of his doughty engineering achievements. But it is in the power of the directors, in the interests of the shareholders, to check this kind of thing.

I am not at all sure that contractors are altogether in favour of this system of ousting the engineer by stumping the country with designs gratis. One of the leading contractors told me not very long ago that, although he is obliged to prosecute this piratical engineering "because the others do so," he endeavours to discourage it to the best of his ability.

Only a step above the mere copyist is the formulæ hunter, who thinks he may become an engineer by merely taking rules and formulæ from text-books and pocket-books. Without any knowledge of the

principles and practical conditions which should govern or influence their application, he produces or evolves enormities in construction which pass muster as gas apparatus, and which, but for the kindly pruning and whitewashing of the obliging contractor, would be absolutely impossible of manufacture, much less are they worthy or economical examples of engineering.

For my part, although I have written a great deal on engineering constructions in gas-works, and compiled many rules and formulæ to facilitate the working out of strains on such structures, I would state as emphatically as I can that all I have done in this way is worthless —*except to engineers*. I have written for *engineers* only—those who have received both a practical and a scientific training as such, and not mere engineering quacks. I would, therefore, warn all those who have not received such training (unless, indeed, they are students in engineering) to leave my rules and formulæ severely alone. Formulæ and ready-made rules are extremely useful to an engineer who knows how they have been constructed, and who can temper and modify them to suit the ever-varying conditions which pertain to the design of almost all engineering structures. But they are dangerous in the hands of inexperienced persons, as you so well point out in your leading article this week.

That gas-works must be rescued from the indirect rule of contractors, and gas engineering from the hands of the incompetent, goes without saying. The way to effect this is for the directors of gas companies to call in an independent gas engineer, in all cases of extensions and remodelling of works, where the manager of the gas-works has not received a thorough and regular engineering training beforehand.

27, *Great George Street, S.W., Nov.* 28, 1894. F. S. CRIPPS.

Gas-Fires in Bedrooms.

SIR,—Your article upon this subject which lately appeared in the JOURNAL favoured the adoption of some system by means of which a tenant of a bedroom in an hotel would be able to obtain a gas-fire on payment of a coin. I am at one with you, in believing that there is a most extensive field for the supply of gas in this direction. Messrs. Fletcher and Co. criticize adversely the supply of gas-fires at a charge based upon time—curiously stating that they have such an apparatus, which they highly commend but adversely criticize. The apparatus spoken of is one submitted to them by myself; and in answer to their objections, I give my own opinion.

What hotel proprietors desire from a business point of view (and if a business in this direction is to be cultivated, it must be by meeting the requirements of those parties who have to invest capital in the undertaking) is an apparatus that will pay. Customers of hotel proprietors frequently fail to consume a portion of their purchases; but it is not usual to hand this to the next customer. If a penny-in-the-slot meter was fixed in a bedroom, it would be unsightly; and the amount of gas paid for but unconsumed would be left for the next tenant to use, which, of course, is not desirable from the hotel proprietor's point of view. What is wanted is a small, ornamental box placed on the mantelpiece, into which the tenant can drop a coin, and obtain in return a gas-fire for twelve hours, or any less period. If he uses it the whole of the time, the hotel proprietor will receive a profit upon the transaction; and should he only have the fire lit a portion of the time, the hotel proprietor would be making an extra profit during the time the stove was not burning. The tenant of the room on the following night would have in any case to put in another coin if he required any gas.

The pith of the whole matter lies in the adoption of such a system as would be profitable to the hotel proprietor, and at the same time would commend itself to his customers; and the adoption of the method explained above would, I believe, meet both these requirements, and lead to a large increase in the consumption of gas.

Similar objections to those made by Messrs. Fletcher were made by meter makers when I submitted to them the first practical automatic gas-meter. They refused to countenance it; and I made and fixed, at my own expense, the first fifty meters on this principle which were ever fixed. That created the present enormous demand; and I am now, on similar lines, about to illustrate the feasibility of my scheme of heating the chambers of a large hotel on this principle.

Manchester, Nov. 26, 1894. THOS. G. MARSH.

Cooking by Gas.

SIR,—Notwithstanding the unquestionable economy and convenience of cooking by gas, it does not meet with the same encouragement in the average provincial towns as it does in the Metropolis and other large places; and the cause of this arises more from carelessness or neglect than anything else.

Domestic servants in the present day are, like everyone else, required to do all their work in a hurry. To do it leisurely, as of old, is not to be thought of. They remove the articles from the stove, expecting to return directly; but being called away to some other work, the stove is forgotten. Thus the gas may frequently be seen burning hours after the stove has ceased to be required; and in this way it may be said that the quantity of gas actually wasted exceeds the quantity required for use. When, therefore, the account is presented to the "unhappy individual" who is required to pay it, he (having no knowledge of the waste) thinks the gas has all been used necessarily; and so he abandons the use of it for the future as too costly.

To remedy this altogether is perhaps impracticable; but nevertheless much might be done in a very simple way to reduce it. If a burner consuming only the very smallest quantity of gas were fixed somewhere near the stove, and kept burning while the stove was in use, and another similar burner were affixed to a piece of flexible tube at some convenient part of the stove, so as to light promptly any portion of it, persons using the stoves—on seeing the great facilities provided for relighting at any moment any portion of it—would soon acquire the habit of turning off the gas immediately it was done with. The consumption of the small burner, if left on by any mischance all day, would be so trivial as not to be deserving of notice. If the stove makers themselves were to supply these articles, it might be expected that in a very short time they would increase their sales sufficiently to remunerate them for their additional outlay.

Nov. 28, 1894. WILLIAM LIVESEY.

Frozen Service-Pipes in Summer.

SIR,—As I am conversant with American practice, and the various plants used in the manufacture of gas in the United States and Canada, I should like to correct the statement communicated to the *Progressive Age*, and referred to in your "Notes" column this week (p. 1018)—viz., that it is "probable that coal gas will be less likely to cause this trouble (naphthalene) than gas made from oil of a high gravity."

In America, where about 65 per cent. of the gas made is carburetted water gas, it is an established fact that, in places where an apparatus for such manufacture has been added to the already existing coal-gas plant, naphthalene deposits (which had previously given much trouble) were greatly diminished, and in some cases entirely overcome. It has also been found that in districts where carburetted water gas only is manufactured—and there are many such—it is the exception to find any trouble with this naphthalene nuisance.

Suffolk House, E.C., Nov. 29, 1894. J. T. WESTCOTT.

Compressed Gas v. Gasholders.

SIR,—With regard to this question, it seemed to me to be altogether out of the range of practical gas-works construction; but since the JOURNAL (to which we look for correct leading) gives the scheme some measure of support, I have gone into the question, and fail to see any economy whatever—either with regard to construction, working, and maintenance, or ground area occupied, except in the latter case with small single-lift holders.

If we take a cylinder, 15 feet in diameter by 35 feet long, this will have to be made of $\frac{3}{8}$ inch steel plate, with double butt strap joints, double riveted, to stand a pressure of 105 lbs. absolute. Assuming this to expand to 15 lbs. per square inch absolute, the effective capacity would be 37,100 cubic feet; and as the weight of such a cylinder would be approximately 38 tons, it gives a weight of over 1 ton of material for every 1000 cubic feet capacity. This compares unfavourably with the weight of a gasholder of similar capacity; and bearing in mind the nature of the material and workmanship required to withstand such a pressure, there would be no economy compared with a holder and tank of the usual construction.

I find that whatever the diameter, and whatever the pressure (up to 150 lbs. per square inch), this proportion of about 1 ton of material for 1000 cubic feet capacity holds good.

With regard to the cost of filling at this pressure, I doubt whether it could be done for less than ½d. per 1000 cubic feet; and the large amount of heat generated in so doing would be dissipated, and so necessitate means being taken to supply heat when expanding into the ordinary holder.

No account has been taken of any loss of illuminating power likely to result from gas of (say) 16-candle power compressed to such an extent.

Durham, Nov. 26, 1894. E. H. MILLARD.

Increased Storeage at the Matlock Gas-Works.—The Matlock and District Gas Company having recently decided to add to their plant a new telescope gasholder and metal tank, they invited designs and tenders from a limited number of firms who submitted various offers, some of which were for holders without guide-framing. Among the tenders was one by Messrs. Cutler and Sons, of Millwall, which comprised a steel tank and a holder with wrought-iron lattice-work guide-framing carried up to the full height of both lifts; and the contract has been awarded to this firm.

The Cork Corporation and the Gas Company's Affairs.—At the meeting of the Cork Municipal Council last Friday week, the annual report of Mr. M. P. Buckley, the Auditor for the Corporation of the Gas Company's accounts, was read. It stated that the reduction of 3d. per 1000 cubic feet which had been made in the price of gas was a saving to the ratepayers of £2500. He had called attention, on behalf of the Corporation, to the payment by the Company of a dividend of 8 per cent., free of income-tax. This custom, he said, had since been changed; and the dividends were no longer payable free of income-tax. This meant an additional saving. The amount the citizens now paid would be £3400 per annum less than formerly. Mr. Buckley's report was deemed very satisfactory.

Gas-Works Extensions at Widnes.—On behalf of the Local Government Board, Mr. Arnold Taylor held an inquiry at Widnes last Tuesday, into an application by the Town Council for sanction to borrow various sums of money, among them being £11,503 for gas-works purposes. The Town Clerk (Mr. H. S. Oppenheim) explained that this amount was required for the extension of the retort-house, carbonizing plant and machinery, new meter-house, workshop, stores, and new sulphate of ammonia plant, all of which were rendered necessary by the increase in the business within a recent period. This, he said, had been caused by the remarkably cheap rate at which gas was sold in the borough—viz., 1s. 10d. per 1000 cubic feet; and a discount to large consumers brought it down to 1s. 8d. Mr. Isaac Carr, the Gas Engineer, stated that the present producing power of the works was 940,000 cubic feet per diem; and the maximum make last winter was 701,000 cubic feet—leaving a margin of 239,000 cubic feet. There had been an enormous increase in the consumption of gas; and he estimated that the maximum make this year would be 882,000 cubic feet, and the margin would be insufficient. In consequence of the low rate at which gas was supplied, works in the town, which had previously manufactured their own gas, were now consuming that of the Corporation. In addition to this, there was an enormous household consumption. The Corporation also did a large business in stoves, and had recently introduced "penny-in-the-slot" meters, which, from the applications already in, meant a consumption of 10 millions per annum. The Town Clerk informed the Inspector that, even at a low price of gas, the works were very profitable. There was no opposition.

PARLIAMENTARY INTELLIGENCE.

NOTICES GIVEN FOR BILLS (SESSION 1895) RELATING TO GAS AND WATER SUPPLY AND ELECTRIC LIGHTING.

Aberdeen Harbour.—In the General Bill to be promoted for the transfer of the property of the existing Commissioners of Aberdeen Harbour to a new body of Commissioners, provision will be made to enable them to contract for supplies of gas, water, and electricity for harbour purposes, and to levy rates for the same.

Ambleside Local Board (Gas and Water).—The Ambleside Local Board intend to seek authority to purchase the undertaking of the Ambleside District Gas and Water Company, Limited, which will be dissolved; to maintain, continue, and extend the existing gas and water works; to acquire further lands; and to manufacture gas and residuals, and supply gas and water within certain limits to be prescribed. The usual powers necessary for carrying on such an undertaking will be applied for, as well as sanction for raising money.

Barnsley Corporation (Water).—The Corporation of Barnsley intend to ask Parliament for authority to carry out a scheme of new works. They comprise a reservoir, called the Midhope reservoir, to be situated in the township of Bradfield, with various conduits, road diversions, and pipe-lines, and a service-tank in the township of Wortley. Power will be sought to divert and use the water of certain tributaries of the River Porter or the Little Don; to extend the limits of supply, so as to include a number of townships in the West Riding of York; to make provision for the sale of water to local authorities and others; and to raise more money.

Bray, Dalkey, Kingstown, and Blackrock Water.—The Bray Township Commissioners are about to seek parliamentary sanction to a scheme of improved water supply for the townships of Bray, Dalkey, Kingstown, and Blackrock. The works will comprise four service reservoirs—one at Ballybetagh, another at Kill, another at Dalkey, and the fourth at Kilbride—with the necessary conduits or pipe-lines. Powers will be sought to appropriate the waters of Lough Bray Upper and Lough Bray Lower, in the parish of Powerscourt, in County Wicklow, and the waters of all springs and streams flowing into these loughs; also the water of a stream running into the Glencree River, and all water found upon land acquired under the Act to be applied for. Provision is to be made for the constitution of a Joint Water Board, to be elected by the Commissioners and the Local Government Board for Ireland. The necessary authority will be sought for the supply of water in the townships named, and for enforcing its use for domestic and sanitary purposes. The Commissioners wish to purchase by agreement certain mains, pipes, and water rights from the Corporation of Dublin; also to sell, supply, and dispose of surplus water to other townships, districts, or places. The remaining provisions of the Bill to be promoted by the Commissioners will relate generally to the supply of water, and to the rates and charges to be made therefor, as well as to the compensation, rating, and borrowing powers of the proposed Board. Sanction will be asked to the application of the existing funds, and to the raising on loan of additional money for the undertaking.

Bray Township Improvement.—The Bray Township Commissioners have given notice of an Improvement Bill, in the course of which they will ask for authority to acquire the electric light works which have been established by Messrs. J. E. H. Gordon and Co., Limited, and to carry on and extend them; together with the necessary powers to levy and recover rents, rates, and charges in respect to the supply of electricity therefrom.

Bridlington and Quay Water.—Application is to be made by the Bridlington and Quay Water Company, Limited, for dissolution and re-incorporation, with power to construct and maintain waterworks, and supply Bridlington and the adjacent places with water. The usual powers granted to water companies will be sought, as well as permission to raise additional capital.

Brighouse Improvement.—Authority will be sought by the Brighouse Corporation to purchase the undertaking of the Rastrick Gas Company, which will be dissolved, and to carry it on with powers of supply throughout the gas limits of the Corporation and the Company. The Corporation wish to acquire a portion of the gas and water undertaking of the Halifax Corporation in Hove Edge; and they will ask to have vested in them the water undertakings formerly belonging to the Brighouse and Rastrick Local Boards, with power to extend their limits so as to include the whole of the borough. The application will include further borrowing powers.

Bristol Water.—The Bristol Water Company intend to apply for an extension of time for the construction of certain works authorized by their Acts of 1888 and 1889, and also for power to acquire by agreement or take on lease and hold lands for the protection of waters, and to sell or lease them subject to special conditions. Further money will be required; and this it is proposed to obtain by the issue of shares and on loan.

British Gaslight Company, Limited.—The British Gaslight Company, Limited, have notified their intention of applying for an Act to enable them to expend further capital for the purposes of their works and undertaking at or near Etruria, in Hanley, and at Brownhills, in Burslem.

Brymbo Water.—The Brymbo Water Company purpose applying for an extension of the time specified for the completion of certain works authorized by their Act of 1888, and also for power to raise further capital.

Chelsea Water.—The Chelsea Water Company will seek power to carry out some new works at Molesey and Surbiton. They will consist of a filter-bed in St. Mark's, Surbiton, two main pipe-lines, four branch lines, and an overflow and wash-out drain, with the necessary subsidiary works. Authority will be sought to raise a sum not exceeding £50,000, by the issue of debenture stock, to pay for the above-mentioned works, and to be applied to the general purposes of the Company.

Chesterfield Gas and Water Board.—The Corporation of Chesterfield notify their intention of asking Parliament to authorize the constitution and incorporation of a Gas and Water Board for the borough and the adjacent districts, the purpose of which will be the purchase, by compulsion or agreement, of the undertaking of the Chesterfield Water and Gas Company, which is to be vested in the Board. The Company will, of course, be wound up and dissolved. The Board will ask for the usual powers to enable them to carry on the undertaking, and to levy rates for the supply of gas and water. Permission will be sought to make agreements with sanitary authorities, companies, and persons for the sale of gas and water beyond the defined limits, as well as for the transfer of parts of the undertaking to other bodies. Borrowing powers are to be sought. The Bill to be promoted will provide for making rates-in-aid; and it will include provisions for the contribution, by the constituent authorities and others, of funds to make good any deficiency of income.

City Commissioners of Sewers (Baths and Wash-houses).—The Bill which the Commissioners of Sewers of the City of London have notified their intention of promoting, to enable them to adopt the Baths and Wash-houses Act in the City, to which reference was made in the JOURNAL last week (p. 1016), is to authorize them to "make, construct, and maintain all such connections, engines, machinery, and other apparatus as may be requisite to enable them to supply the baths, wash-houses, and buildings with water, heat, and electricity," and to defray the expenses out of the sewer and consolidated rates, or either of them, and to borrow money upon the security of these rates for the purposes of the Bill.

Clonmel Corporation.—The Corporation of Clonmel intend to apply for authority, among other things, to acquire the undertaking of the Clonmel Gas Consumers' Company, Limited, with the usual consequential powers, and to borrow money for the purpose.

Cranbrook District Water.—Application is to be made to Parliament for the incorporation of a Company to construct works and supply water in Cranbrook and Goudhurst, in Kent, and so much of Hawkhurst as is situated in that county. The works will comprise a well and pumping-station in the parish of Hawkhurst, a service reservoir at Hartley, in the parish of Cranbrook, and a conduit or pipe-line connecting them, and passing through the two parishes. The usual powers will be sought for the compulsory purchase of lands, water rights, and easements, as well as for levying rates and charges, selling water in bulk, and supplying and inspecting fittings, &c. It is proposed to ask for the transfer to the Company of some of the powers conferred by the South Kent Water Act of 1889, and all or any of those vested in the South Kent Water Company.

Croydon Corporation.—In a General Bill to be promoted by the Corporation of Croydon, provision will be made for the removal of some restrictions under the Public Health Act, 1875, and the Croydon Corporation Act, 1884, as to the supply of water by the Corporation within certain parts of the borough now served by the Lambeth Water Company. It is proposed that the Corporation shall purchase so much of the Company's plant and rights as relate to the supply of water in the South Norwood, Upper Norwood, and West wards of the borough, and that the Company's privileges in regard thereto shall be extinguished. The Corporation will ask for power to make bye-laws for preventing waste of water and for testing cisterns, &c.; also to borrow money.

Dewsbury and Heckmondwike Water.—It is the intention of the Dewsbury and Heckmondwike Water Board to apply for power to carry out some important works, comprising a reservoir on the Porter or Little Don River, at Langsett; various aqueducts and pipe-lines in connection therewith; and a new road and a road diversion. All these works will be in the West Riding of York. Authority will be sought to impound streams and waters, and to purchase lands compulsorily. Provision will be made for the supply of water to local authorities and also for furnishing compensation water. It is proposed that the Heckmondwike Local Board should have power conferred upon them to sell their share of the joint undertaking to the Dewsbury Corporation; and in this event the Water Board would be dissolved. The necessary borrowing powers will be included in the application.

Dublin Corporation.—In a General Bill to be promoted by the Dublin Corporation, there will be included, as already intimated in the JOURNAL, provisions in regard to the supply of gas and water. The Corporation will ask to be authorized to make further arrangements for the testing and measurement of gas and the appointment of gas examiners; for the revision of the standard price of gas now supplied by the Alliance and Dublin Consumers' Gas Company; for the audit of the Company's accounts by an official or officials to be employed by the Corporation; for the appointment of Gas Referees by the Board of Trade (the Board also to determine as to the efficiency of the gas-testing arrangements); and for compelling the Company to give notice to the Corporation before being entitled to examine or test any of the lighting plant belonging to the latter. With regard to water, the Corporation will apply for power to prescribe and limit the respective maximum or statutable quantities to be supplied to the Commissioners of neighbouring townships, and to charge for this water by meter at such rate as may be determined—the Commissioners having the right to dispose of any surplus water within their limits. The Corporation specify that they are not to be liable for any failure of the supply of water to the Commissioners; and they preserve all their water rights in any of the townships in question. It is proposed that the moneys arising from the public water-rate shall be allocated to the purposes of the Dublin Fire Brigade; and the amounts borrowed or to be borrowed by the Corporation, and expended or to be expended, for water-works purposes, are not to be subjected to the operation of, and limited by, section 238 of the Public Health (Ireland) Act, 1878.

Edinburgh and District Water.—The Edinburgh and District Water Trustees intend to apply for authority to carry out new works for affording an additional supply of water and for compensation purposes. The works will comprise the construction of the Talla reservoir in the parish of Tweedmuir, in Peebles, and the Fairmilehead reservoir, in the parish of Liberton, in Midlothian, with the necessary aqueducts. Power will be sought to purchase the undertaking of the Liberton Water Company compulsorily or by agreement; to extend the area of compulsory supply; to make alterations in the rates and charges; and to borrow money.

Felixstowe and Walton Water.—The Felixstowe and Walton Water Company desire to be empowered to dissolve and reincorporate, and to supply water for public and private purposes in the parishes of Felixstowe and Walton, as well as in parts of the parishes of Trimley St. Mary and Trimley St. Martin, under the usual conditions. The Bill to be promoted will contain provisions for the sale of the undertaking to the Local Board, and for the raising of money by the Board for the purchase and carrying on thereof.

Hayward's Heath Gas.—The Hayward's Heath Gaslight and Coke Company, Limited, desire to be dissolved and reincorporated under a different title, with power to supply gas in the parishes of Lindfield, Cuckfield, Keymer (detached), Clayton (detached), Keymer, and Wivelsfield, in Sussex. They wish to maintain and continue their existing gas-works, and works connected therewith, to purchase additional land, and construct new works. It is proposed to acquire, by agreement, the undertaking of the Cuckfield Gas Company, Limited, which will then be dissolved. Further capital will be needed.

Hebden Bridge and Mytholmroyd Gas Board.—Application is intended to be made to Parliament by the Local Boards of Hebden Bridge and Mytholmroyd, in the West Riding of Yorkshire, for authority to constitute a Joint Gas Board, to acquire and manage the undertaking of the Hebden Bridge Gas Company, which will, of course, be dissolved. In the Bill to be promoted for the above-named purposes, provision will be made for the election of members, meetings of the Board, &c. The Board will exercise all the powers possessed by the Company. They will ask for authority to enter into agreements with local bodies for the sale of gas beyond the limits of supply, or to sell portions of the undertaking to them, and to raise money for carrying on the business.

Hebden Bridge Local Board (Gas).—The Hebden Bridge District Local Board intend to apply for power to purchase the undertaking of the Hebden Bridge Gas Company, on the conditions specified in an agreement, dated the 28th of May last, made between the Company, the Local Board, and the Mytholmroyd District Local Board, or on such other terms as may be specified by Parliament, or be determined upon. Authority will be sought to carry on the undertaking with the customary powers, or, if thought fit, to dispose of part of it to other bodies. The Board will apply for the necessary money to enable them to carry out their project.

Ilfracombe Gas.—Application will be made by the Ilfracombe Gas Company for authority to extend their limits of supply so as to include Ilfracombe, Morthoe, West Down, Bittadon, Berrynarbor, and Combmartin, or some of them; also to acquire land and erect new works. Power will be sought to manufacture and deal in stoves, machinery, and other appliances; to raise further capital; to change the denominations of the authorized and existing shares and stock; and to define the dividends to which they are to be entitled.

Kingston-upon-Hull Corporation.—In a General Bill for which the Corporation of Kingston-upon-Hull have given notice, authority will be sought to extend the limits of water supply, to confer on the Corporation further powers in relation to the water undertaking and the supply of water, and to define what shall be deemed a supply for domestic purposes. The Corporation will ask for power to borrow more money for the purposes of their water undertaking.

Lambeth Water.—The Lambeth Water Company intend to make application for power to construct additional reservoirs, and to enlarge the existing reservoir, in the parish of West Molesey, with the necessary channels, adits, filter-beds, and other auxiliary works. Parliament will be asked to apply to the new works the Company's existing powers in regard to taking water from the River Thames; also to extend the provisions of the Metropolis Water Acts, 1852 and 1871, to outlying parts of the Company's district. It is proposed that the County Councils of Kent and Surrey shall be constituted the Metropolitan Authority under these Acts. The Bill to be promoted will contain provisions as to the waste and misuse of the Company's water; also as to the formation of a sinking fund, to be held and applied by the Chamberlain of London. Authority will be sought to raise additional capital, not exceeding £500,000, by debenture stock, to be applied to the works to be specified in the Bill and to the general purposes of the undertaking.

London Water-Works (Transfer).—As already recorded in the JOURNAL, the London County Council have given notice of their intention to promote eight Bills for the acquisition of the undertakings of the London Water Companies. The several notices have been drawn mainly on the same lines; and their principal portions were given last week (p. 1031).

Merthyr Tydfil Local Board Water.—The Local Board of Merthyr Tydfil will apply for authority to make and maintain an additional reservoir, to be called the Upper Neuadd reservoir, partly in Llanfrynach and partly in Cantref, with four aqueducts in connection therewith. The waters of certain tributaries of the River Taff are to be diverted for the purposes of the undertaking. Additional money will be applied for. The Board are desirous of increasing their rents, rates, and charges, and of making a special rate.

Newmarket Gas.—Application will be made by the Victoria Newmarket Gaslight and Coke Company, Limited, to be dissolved and reincorporated. It is proposed to convert the existing capital into stock, and to raise further money for the purposes of the undertaking. Powers will be sought to manufacture and sell gas, and to produce and supply electricity, for lighting; also to make and supply meters, fittings, stoves, &c. The Bill to be promoted for carrying out the foregoing objects will include provisions as to the purchase of lands, the limits of supply, and other matters.

North Middlesex Gas.—The North Middlesex Gas Company, Limited, intend to apply for authority to dissolve and reincorporate the Company, with power to supply gas in parts of the parishes of Hendon and Finchley. They desire to maintain and continue their existing works, to acquire lands and construct new works, and to manufacture gas and residual products, as well as meters, fittings, cooking or electric apparatus, &c. In the Bill to be promoted, provisions will be included for the supply of gas in bulk, for making agreements with local authorities and others, and for raising additional capital.

Rotherham Corporation.—The Corporation of Rotherham desire to be empowered to construct new water-works, consisting of a well and pumping-station in the parish of Whiston, and a pipe-line connecting it with the existing reservoir in Boston Park. They likewise wish to have an extension of the time specified for the completion of the Dalton reservoir and works, as well as an enlargement of their limits of supply, so as to include the whole of the parishes or townships of Brinswork, Whiston, Greasborough, and Dalton. The Corporation also seek power to confirm an agreement made with the Greasborough Local Board for the supply of water to their district; the Board to be enabled to borrow the necessary money. They further wish to be empowered to adopt measures for the appropriation of the watersheds of the Little Don River and the Hagg, Thickwood, Harden, and Mikleden Brooks, and other streams flowing into the Little Don, for the purpose of an auxiliary water supply. The application will also include authority to extend and improve the gas-works; manufacture and sell or let on hire meters, stoves, fittings, &c.; and make provision for altering the method of testing the gas. Additional borrowing powers will be sought.

Scarborough Gas.—The Scarborough Gas Company intend to apply for power to raise further capital and convert and consolidate that which now exists; also to alter the provisions of their Acts which relate to charges for gas, to dividends, and to the reserve and insurance funds. It is proposed to erect additional works on land already purchased; and authority will be sought to acquire other land. The Company will seek to be empowered to manufacture stoves, meters, and other apparatus, which are to be exempted from distress. The maximum price of gas within the borough is to be altered, as well as the Directors' qualification; and further or better provision will be made for securing payment of gas-rates, rents, and other charges.

South Metropolitan Gas.—The South Metropolitan Gas Company intend to apply for authority to convert their capital into stock, bearing a uniform lower rate of dividend, to provide for investments in the capital of the Company by persons in their employ, and their representation in the management, and to make other provisions which were fully set out in the JOURNAL last week (p. 1025).

St. Ives Gas.—The Corporation of St. Ives (Cornwall) notify their intention of applying for an Act to enable them to purchase, extend, and improve, and continue the gas-works in that town, and to manufacture and supply gas under the usual conditions.

Whitby Water.—The Whitby Water Company will apply for authority to confirm the acts and deeds of the Directors in relation to the acquisition of lands and waters, the construction of works, and otherwise, and to indemnify them from liabilities. The making of the existing works is to be legalized; and power will be sought to carry out new works, comprising an alteration of the Randy Mere reservoir and the formation of two pipe-lines. A deed of grant executed on March 11, 1871, between Mr. W. Foster and others and the Company is to be revoked. The usual powers incidental to water supply will be applied for; and also authority to raise further capital.

York New Water-Works Company.—This is an application by the Company for an amendment of their Acts of 1846 and 1876, and for a better definition and extension of their limits of supply, so as to include the townships of Bishopsthorpe, Water-Fulford, East and West Huntington, Earswick, and Towthorpe. Additional capital will be required; and the existing shares are to be converted and consolidated. Authority will be sought to purchase more land and extend the works, supply water in bulk, inspect fittings, &c. It is proposed to change the name of the Company to the York Water-Works Company.

NOTICES OF APPLICATIONS TO THE BOARD OF TRADE FOR PROVISIONAL ORDERS (SESSION 1895).

Under the Gas and Water Works Facilities Act, 1870.

Barnstaple Gas.—Application will be made by the Barnstaple Gas Company for power to raise further capital for the purposes of their undertaking, by the creation of new ordinary or preference shares or stock.

Bognor Gas.—The Bognor Gaslight and Coke Company, Limited, will apply for power to construct an additional gasholder and other works for the manufacture and storeage of gas and residual products on land adjoining their present property.

Felixstowe Gas.—The Felixstowe Gaslight Company, Limited, intend to apply for power to maintain and continue their existing works, convert residual products, and manufacture and supply gas within the parishes of Walton and Felixstowe, Trimley St. Mary, and Trimley St. Martin, in Suffolk; to sell gas in bulk; to manufacture, purchase or hire, and supply gas meters, stoves, fittings, &c.; and to levy rates and charges. It is proposed to define and regulate the existing capital, and make such provisions as may be necessary with respect to the finances of the Company.

Holyhead Water.—The Holyhead Water-Works Company desire authority for the construction and maintenance of certain works in the parish of Holyhead, comprising an enlargement of their existing reservoir and a new reservoir on the northern side thereof, together with the necessary auxiliary works. Power to acquire additional lands and raise further capital will be applied for.

Kildwick Parish Gas.—The Kildwick Parish Gas Company purpose applying for authority to raise additional capital, for the general purposes of their undertaking, by the creation and issue of new ordinary and preference shares or stock, or by borrowing; and also to extend some of the provisions of the Kildwick Parish Gas Act, 1876.

Llanberis Gas and Water.—Application is to be made by the Llanberis Water and Gas Company, Limited, for power to supply gas and water in the parish of Llanberis, in Carnarvonshire, and to maintain and extend their existing works and carry out further works. Authority will be sought to manufacture and supply lighting, cooking, ventilating, agricultural, industrial, and other appliances to be worked by means of gas. Permission will be asked for the sale of part of the undertaking to the Local Authority.

Mid-Kent Water.—The Mid-Kent Water Company, Limited, desire power to maintain and continue the water-works they have constructed in the parish of Malling, and to carry out other works in that parish; also to extend their limits of supply so as to include Aylesford. Additional capital will be applied for.

Newark Gas.—Application is to be made by the Newark Gas Company for authority to acquire land for the erection of works, and to extend their limits of supply so as to include Balderton, Barnby, Coddington, Farndon, Hawton, Kelham, South Muskham, Stoke, West Newark, and Winthorpe, all in Nottinghamshire, or some of them. The Company wish for power with respect to laying down and maintaining mains and pipes in roads not dedicated to the public use; manufacturing and supplying stoves, engines, &c.; making applications for authority to supply electricity; and other matters. Permission will be sought to capitalize the sum of £2815 12s., or part thereof, expended on capital account out of revenue, as well as to raise more money by shares or on loan.

Newton Nottage Water.—The Company incorporated or to be incorporated under the name of the Porthcawl Water Company, Limited, intend to apply for power to take over and enlarge the existing water-works in the parish of Newton Nottage, in Glamorganshire, adjoining the Porthcawl Gas-Works, and the tanks and pipes in connection therewith, and to supply water in the parish. Authority will be sought to take, impound, and distribute the waters of local springs or streams, and to levy rates and charges therefor. The usual powers granted in connection with water undertakings will be applied for, as well as permission to raise further capital.

Rothwell Gas.—The Rothwell Gas Company notify their intention of applying for authority to manufacture and supply gas within such parts and precincts of Oulton-with-Woodlesford, Swillington, Loftthouse-with-Carlton, and Thorpe, as are not included within the limits of the Rothwell Gas Act, 1882, and to employ the capital authorized to be raised under it for the purposes of the Order to be applied for. Additional lands will be required; and permission will be asked to purchase these, and to construct new works thereon and on lands already possessed by the Company.

South Hayling Water.—Authority will be sought for the construction of water-works in Hayling Island, with the powers of supply usually granted to projectors of water undertakings. The works will comprise three wells and pumping-stations, storeage reservoirs, filter-beds, conduits, pipes, and other auxiliary works. The amount of capital is to be defined, and provision made for its increase. Permission will be asked for the sale of the undertaking, or any part thereof, to any local authority whose district, or a portion of it, may be within the limits of supply.

Under the Electric Lighting Acts, 1882 and 1888.

Applications will be made under the above Acts for powers in regard to the supply of electricity for lighting and other purposes in the following places: Alderley Edge, Bath, Bootle, Brechin, Carlisle, Crosby, Devonport, Leigh (Lancs.), Liverpool, Llandudno, London (Battersea, Newington, Notting Hill, St. Olave's, Strand), Luton, Margate, Montrose, Motherwell, Pontypool, Prescot and District, Radcliffe, St. George's (Gloucester), Salisbury, Southampton, Swindon New Town, Walthamstowe, Winchester, Windermere, Windsor, and Worthing.

LEGAL INTELLIGENCE.

SUPREME COURT OF JUDICATURE—COURT OF APPEAL.

Monday, Nov. 26.

(*Before the* MASTER OF THE ROLLS *and Lords Justices* LOPES *and* RIGBY.)

Allwood v. Thirsk District Water Company.

This was an appeal by the plaintiff against an order of the Divisional Court confirming the Judge, who upheld the Master, granting a stay of proceedings under section 4 of the Arbitration Act, upon the ground that the work in respect of which the action was brought had been done under contract, which ousted the jurisdiction of the Court. The plaintiff contended that, in the circumstances under which the contract was signed, he was not bound to go to arbitration at all; that the arbitration clause was bad; and that it was set aside so far as the work in question was concerned. He further contended that the Arbitrator named in the contract—viz., the Engineer of the Company—ought not to be allowed to act, as he had practically prejudiced the question; in addition to which his negligence was the real cause of the whole dispute.

Mr. TEMPLE FRANKS appeared for the appellant; Mr. WILLES CHITTY represented the respondents.

Their LORDSHIPS (without calling upon the respondents' Counsel) dismissed the appeal with costs; holding that the parties had entered into a binding contract, under which all disputes were to be referred to the arbitration of the Engineer.

COURT OF SESSION—FIRST DIVISION.—Tuesday, Nov. 27.

(*Before the* LORD PRESIDENT, *and Lords* ADAM, M'LAREN, *and* KINNEAR.)

The Corporation of Falkirk v. The Falkirk Joint-Stock Gas Company and Others—The Question of an Oversman.

Counsel were heard and judgment given to-day in a reclaiming-note by the complainers against the decision of Lord Low in the Bill Chamber (*ante*, p. 932) in the application by the Corporation of Falkirk to have the Falkirk Joint-Stock Gas Company, Mr. J. Barr, C.E., of Glasgow, and Messrs. Corbet Woodall and E. Herbert Stevenson, of London, interdicted from proceeding with the arbitration to determine the price to be paid by the Corporation for the undertaking of the Company with Mr. Barr as Oversman. The appointment of Mr. Barr was made by Messrs. Woodall and Stevenson, who are the Arbiters; and the objection to him by the Corporation was that they had, prior to his appointment, consulted him upon their case, in July last. In the Bill Chamber, Lord Low refused the application; finding the Gas Company entitled to their expenses. The complainers reclaimed.

Mr. URE and Mr. WILSON appeared for the complainers and reclaimers; Mr. COMRIE THOMSON and Mr. CRABB WATT, for the Company; Mr. DICKSON and Mr. WATT, for Mr. Barr.

Mr. URE said he proposed to add to the statement of facts which was before the Bill Chamber an additional statement of facts which had since come to their knowledge. This statement was to the effect that, at the time when the Arbiters appointed Mr. Barr, they were in entire ignorance of the circumstances set forth; that the only information they had at the time as to Mr. Barr's connection with the case, was that he had been asked to act for the complainers as a witness; that this information was given to them by Mr. Barr in a telegram sent to Mr. Woodall on Oct. 9, stating that he had done nothing and was free to act; and that the telegram was misleading in respect that it represented that Mr. Barr's only connection with the matter was that he had been asked, some time before, to act as a witness for the complainers, whereas, in point of fact, he had not only been so, but had been consulted by the complainers regarding the subject-matter of their case, had been put into possession of their views, and had advised them as to the getting up of their case. They maintained that it was the duty of Mr. Barr to have made a full disclosure of these circumstances to the Arbiters; and that if he had done so, the Arbiters would never have appointed him. The complainers' case therefore was that Mr. Barr was disqualified from acting as Oversman, in respect that some weeks prior to the date of his appointment, he had received a full communication of their views from one of the parties to the reference, and the line upon which they proposed that their case should proceed. Also that he, in turn, indicated to them very fully his views on the same subject, and advised them as to the lines upon which their case should be conducted, and as to the witnesses to be examined. All this took place at the time when the Corporation were not only feeling their way, but after they had themselves fully considered the situation, which they had an opportunity of doing, and which, indeed, there was necessity for their doing, while the Bill was passing through Parliament.

Lord M'LAREN: Would it differ whether an Arbiter had been in communication with the seller or the purchaser?

Mr. URE: I think it would not.

Lord M'LAREN: It is easy enough to see that the disqualification, if it exists, would be much more disadvantageous if the consultation had been with the sellers, because they would probably not wish to disclose the previous history of the gas-works.

Mr. URE said that in the present case the purchasers had had an opportunity of making themselves minutely acquainted, because, at the time the Bill was passing through Parliament, evidence was led upon both sides; and they had considered the subject closely.

Lord M'LAREN: But they could not know the subjects of sale.

Mr. URE agreed that they could not; but at the same time they did know some things. They knew what was the line upon which they were going to meet the sellers; and they possibly—he did not say probably—disclosed to Mr. Barr what might be the weak part of the Company's case, and took his opinion upon it. But it did not signify, in this case, whether the bias was in favour of the buyer or the seller. If it were in favour of the seller, it was obvious that the opposite party would have a strong interest in opposing the appointment; and equally so if it was in favour of the buyer. Both parties were entitled, as matter of right, to have an Arbiter of complete impartiality—an Arbiter with a mind perfectly free from any preconceived opinion or view upon the subject-matter. In the circumstances before them, if the averments were true, they must leave a certain bias in Mr. Barr's mind. He submitted that he had made out a *primâ facie* case of disqualification against Mr. Barr; that interim interdict should be granted; and that the note should be passed sending the case into Court for trial on its merits.

Mr. CRABB WATT said that no ground had been stated upon which there was a *primâ facie* case for reduction of the appointment, which the Corporation must bring before they could get quit of it. Under the Lands Clauses Act, there was an effectual, valid, and final appointment; and the Arbiters, in making the appointment, did a judicial act, which could only be got rid of by a reduction. The case therefore had been discussed all along upon the footing that a reduction must be brought, and that an interdict was not the remedy.

The LORD PRESIDENT: Mr. Ure, I think your position is a very sophisticated one. I can quite understand your saying Mr. Barr is a partizan of the other side, or that he is so much your partizan that you are afraid the other side might reduce any award he might make.

Mr. URE: I do not go that length. I say that, having full information of the evidence, he has a natural bias in favour of the side he is engaged upon.

The LORD PRESIDENT: What harm would that do you?

Mr. URE: That Mr. Barr, knowing that he would go into the chair as a biassed man, would naturally take a view in the opposite direction, so as to rectify the bias which he knows that both parties are aware exists.

Mr. WATT said that Mr. Barr's position was this, that the interdict was served upon him, he being called as one of the respondents; but he had not lodged a statement of facts. When, however, he saw those which were lodged—feeling it to be a reflection upon his professional character—he desired to lodge a minute, stating exactly what took place between him and the Corporation. He became no party to the proceedings; but if their Lordships were to allow the record to be amended, they would require to see Mr. Barr, and get his opinion as to whether he would now require to become a party in respect of these serious averments.

The LORD PRESIDENT in disposing of the case, said he agreed with the Lord Ordinary. The grounds of suspension and interdict, even when thoroughly canvassed and considered, as they had been that day, seemed to him to afford no grounds for interim interdict; and they would certainly be taking a serious responsibility if they were to grant an interim interdict which would have the effect of stopping the arbitration proceedings. He was generally (on the grounds stated by

the Lord Ordinary) against granting interdict. But on the question of whether or not the note should be passed, his judgment was determined by one consideration. If the complainers had fulfilled their expressed intention of bringing a reduction, then he thought it might have been for consideration whether the note should be passed. But although this case came into Court on Oct. 20, they had no sign of a reduction now, except an expression of the same intention. Upon that ground, he thought the note ought not to be passed, because it was quite plain that any operative proceedings would be taken in the reduction, and not in the note of suspension. On the question which had been argued, as to the grounds of disqualification, he desired to observe a certain degree of reserve, because, should the complainers bethink them of bringing a reduction, that question might have to be determined in the reduction; and he thought, therefore, it was better for him to abstain from discussing a question which might ultimately come up for determination.

Lord ADAM said he was of the same opinion. There was a question on the merits to be tried—viz., whether or not the alleged actings of Mr. Barr were such as to disqualify him from acting as Oversman. But that was a question which it was in the power of the complainers to try by the proper action of reduction; and if they thought they had a good case, let them try it.

Lord M'LAREN said that, in considering such cases, it had to be kept in view that personal disqualification was a ground upon which the Court could be invited to interfere with the proceedings in an arbitration. It was obvious that the exercise of such a jurisdiction was a very delicate one, because there was not any arbitration as to which, at some stage or other, it would not be possible to make a plausible case of deviation from the statutory requirements, or bias, or irregularity of some kind. It therefore appeared to him that it was only in a very plain and palpable case of disqualification or irregularity in proceedings, that they ought to interfere by interdict; and no such case, in his opinion, had been here set forth. It was, he thought, an additional reason to those which had been very clearly set forth by the Lord Ordinary, that they were told from the bar (and the statement was not contradicted) that under that statute, if the interdict were granted, and should stand, it would be impossible to proceed with the arbitration within the period of three months. Now, if interdict were to be granted at all, it ought to be an effective inderdict—an interdict which should continue until the decision of the principal action; and it appeared that such an interdict would virtually be equivalent to a decree of reduction, because, unless this case were disposed of within a time that would be probably unexampled in the history of the Court, the result would be to bring the arbitration to an end. He therefore agreed with their Lordships.

Lord KINNEAR also agreed.

The judgment of Lord Low was thus affirmed; and the Company were allowed further expenses.

Mr. WATT asked the expenses of that day's appearance for Mr. Barr, who, he said, had been attacked, and had been obliged to attend to see that the amendment should not be allowed.

The Court, however, refused the application.

A Railway Company's Water-Rate.—Last Wednesday, at the Bloomsbury County Court, Judge Bacon heard the case of *The West Middlesex Water-Works Company v. The Metropolitan Railway Company*, which was an action to recover £7 4s. water-rate. The Railway Company put in a counter-claim for £7 5s., paid by mistake in connection with the bursting of a water-main at the Gloucester Road Station. Mr. Houghton, for the defendants, explained that the Gloucester Road Station was a joint station under a Joint Committee of the Metropolitan Railway Company and the District Railway Company. In May, 1892, a service main pipe burst outside the station, doing considerable damage. The Engineers of the Water Company proceeded to ascertain exactly on whose ground the flood took place; and they came to the conclusion that the Metropolitan Railway Company were liable. An account for £7 5s. was sent in, which was passed and paid by the Metropolitan Railway officials. Afterwards, however, the House-to-House Electric Lighting Company having brought an action against the Metropolitan Railway Company for damages owing to the bursting of the main, the whole matter was inquired into; and it was then found that the land on which the service-pipe was situate belonged to the District Railway Company. After a long hearing, his Honour said he had no evidence before him that the land belonged to the District Railway Company. He gave judgment for the plaintiff Company, the judgment not to be enforced before Feb. 1 next, in order to enable the Metropolitan Railway Company to bring a substantive action for the return of the £7 5s. The Water Company were granted costs.

The Gaslight and Coke Company and the Employers' Liability Act.—His Honour Judge Lumley Smith, Q.C., gave judgment last week, in the Westminster County Court, in an application made by The Gaslight and Coke Company for a new trial in the case of *Brooks v. The Gaslight and Coke Company*, in which a jury found for the plaintiff for £30. The case was before his Honour and a jury on Nov. 2, when Brooks claimed damages, under the Employers' Liability Act, for injuries received through the tilting of a ladder. The ladder was in the hatchway of a barge; and Brooks was engaged in company with 32 other men in bringing coals up on to the wharf of the defendant Company. Brooks was sliding down the ladder when it tilted. The defence was that the plaintiff should have walked down the ladder; and that he met with the accident through no fault of the defendants. On the 19th ult., Mr. Loehnis applied for a new trial, on the ground that no reasonable men could have by any possibility found for the plaintiff. Mr. Lawless opposed; and his Honour adjourned judgment—borrowing the transcript of the shorthand notes of the trial. His Honour, in giving his decision, said the jury, after a contest of fact as to whether the ladder tilted, found that it did. There was also only one ladder instead of two. He found there was evidence that reasonable men might find as they did. As to contributory negligence, it was, no doubt, improper to slide down the ladder; although it was, according to the evidence, as safe as, or even safer than, walking down. Several men had been cautioned against sliding down; Brooks had not. He should not grant a new trial, but dismiss the application, with costs.

MISCELLANEOUS NEWS.

METROPOLIS GAS SUPPLY.

The Proceedings of the Gas Consumers' Protection League.

The First Annual Meeting of the above-named League was held last Thursday, at the Foresters' Hall, Clerkenwell—Mr. J. ROWLANDS, M.P., in the chair.

The CHAIRMAN, in opening the proceedings, referred to the steps which had been taken by the League to further an agitation which was of great interest to the industrial classes, and to the effect which their representations had had upon The Gaslight and Coke Company, the Governor of which (Colonel Makins) had issued an elaborate reply. He (Mr. Rowlands) had not replied to that, because he did not think it devolved upon him to teach the Company their methods of business; and another reason was to be found in the speech made by Mr. Livesey soon after the issue of the Governor's memorandum. Further than that, the figures of February had been answered by the figures of August, and by a reduction in price, which meant a gain of £240,000 to the gas consumers of London. The League were carrying on a correspondence with the Board of Trade as to the legality of the charge for meters. Up to the present, the Board had not given any definite information on the subject; but the League intended to have a decided expression of opinion from that authority as to whether the Gas Companies were justified in making the charges they did. In his opinion, the fight would have to be continued for some time to come; and, not content with a simple reduction of 3d., they would go on and attack the difference of 6d. per 1000 cubic feet which still existed between the charges north and south of the Thames. If there was to be monopoly, they would have to go farther, and say that the monopoly should be in the hands of a central body representative of the whole of the people of London.

The HON. SECRETARY (Mr. Benny) then read the annual report, in the course of which it was stated that nearly 100,000 pamphlets and leaflets had been issued since the formation of the League; and the demand for literature was growing. A deputation had waited on the St. Luke's Vestry; and, as a result, that Vestry had called a conference, which protested against the action of The Gaslight and Coke Company. A deputation had also waited upon the Board of Trade, the President of which (Mr. Bryce) promised that the careful attention of the Board should be given to the subject. Numerous public meetings had also been held during the year; but, up to the present, no special appeal for funds had been made. If the work of the League was to be successfully carried on, greater funds would be necessary.

Mr. PICKERSGILL, M.P., in moving the adoption of the report, remarked that the League had a good and strong case; and he trusted they would receive a large amount of support.

The Rev. E. CANNEY seconded the motion; and it was carried.

A resolution was afterwards passed expressing gratification at the reduction in the price of gas, and the opinion that the condition of the gas supply of London would not be satisfactory until there was a uniform system over the whole area. Further, the resolution put forward the hope that the President of the Board of Trade would consent to a parliamentary inquiry into the present condition of the Metropolitan Gas Supply.

The proceedings then closed.

BIRMINGHAM CORPORATION GAS SUPPLY.

Large Extension of Stoking Machinery—A Reduction in Price.

A report will be submitted to the Birmingham City Council at their meeting to-day in which the Gas Committee deal with the above (among other) interesting topics. It states, in the first place, that the Committee have authorized the expenditure of £5955 in the widening of the retort-house at Swan Village, and introducing certain alterations in the method of charging and drawing upon the principles adopted at Saltley, whereby a saving of at least 1s. per ton of coal carbonized has been effected, the whole of the cost of such work to be chargeable to revenue. When the reconstruction of the house is completed, the sum of £4350 will have to be expended in the provision of new stoking machinery. The report continues: The Committee, having regard to the great advantages which have followed the introduction of stoking machinery at Saltley, have been desirous for some time past to see these advantages extended to the whole of the Windsor Street retort-house. They have arrived at the opinion that at present stoking and charging by machinery is the more economical process of carbonization in long retorts, and, moreover, that it affords greater relief to the workmen. They are also satisfied with the result of the trial recently made at Windsor Street of the Arrol and Foulis machines; a considerable economy having followed their introduction. Apart, however, from the question of economy, it has been proved that the work of carbonization is much better done with machines than by hand; the coal is more evenly distributed over the retorts; there is almost an entire absence of deposit of carbon within the retorts; and there has been a considerable improvement in the carbonizing results. Occasionally, when Sunday labour has been resorted to, the machine-charged retorts alone have been worked throughout the day; and during these periods, the production per mouthpiece and per ton have shown a very marked improvement. It is also known that the work is far less exacting to the men employed than hand work. The Committee, having regard to these circumstances, have authorized an expenditure of £14,119 10s. in fully equipping the Windsor Street house with machines of the Arrol-Foulis type. The Committee have completed contracts for the coal that will be required for the whole of the works during the coming year; and, notwithstanding the efforts that were made by coalowners, in some of the districts from which the Corporation draw their supplies, to raise prices by combination, the contracts have been made on terms which, under the conditions, may be regarded as satisfactory. While it appears to have been established that the consumption on the prepayment meters is not more than sufficient to make them slightly remunerative, it

seems to be certain that they have proved to be a great convenience to, and are highly appreciated by, the tenants of weekly houses in the large towns in which they have been introduced; and the Committee are now endeavouring to ascertain if the demand for them exists in Birmingham. Conditions on which gas-fittings as well as prepayment meters will be provided by the Committee in houses let on weekly rents not exceeding 7s. 6d. per week have been prepared for the information of owners and others interested in such houses not at present supplied with gas; and a statement of these conditions is now in course of circulation. With the consent of the Improvement Committee, small boiling-stoves have been added to the fittings already supplied to the artisan's dwelling-houses; and the collection of the pence from the meters is now made monthly on the index reading of the meter, and by the staff of the department. The Committee further state that they have reduced the retail prices of coke as from the 1st ult., and have taken advantage of this revision to place all purchasers of coke, who are willing to arrange for their own cartage from the works, on the same terms. The Committee also report that their estimates of the result of trading during the present year are, in their opinion, sufficient to justify a reduction in the price of gas from the end of the present quarter. They therefore recommend that the price of gas shall be reduced by 3d. per 1000 cubic feet for private purposes, and that a proportionate reduction be made for public lighting, as from the next quarterly reading of the meters.

BELFAST CORPORATION GAS SUPPLY.

Annual Accounts.

The statement of the Belfast Corporation gas accounts for the year ending June 30 last has been published; and from it we have extracted the following figures: During the year the capital outlay has been £40,444; making the total expenditure on June 30, £732,519. Among the items composing the £40,444, it is noticed that £4679 was spent on new mains and service-pipes; £5340 on a new retort-house, fittings, &c.; £20,167 on carburetted water-gas plant, oil-tanks, &c.; £1861 on a new purifying-house and purifiers; £4450 on the exhauster and condenser house; £2725 on the meter-house; and £313 on Yeadon retorts. Deducting from the total expenditure of £732,519, 10 per cent. depreciation on lamps and lamp irons, leaves £727,999; and adding to this the amount standing in the books as the value of the meters (£32,853), and £10,163 which has been handed to the Electric Lighting Committee, makes a total of £771,016. The sum written off from surplus profits (including £15,000 from the past year) is £349,500; so that the capital now figures at £421,516. Turning to the manufacture and sale of gas account, it is seen that the receipts from gas—less discounts (£8077) and bad debts (£222)—amounted to £112,744. After allowing for the cost of lighting and repairing the lamps, the revenue from the public lighting was £12,308. The residuals produced £53,561; and stove-rents yielded £1832. Two other small items made the total revenue £180,485. Concerning the expenditure, the cost of the coal deposited on the works (100,961 tons) was £85,359. Purification absorbed £4431. The salaries of the Engineer and his Assistant came to £1365; and carbonizing wages, to £15,712. The repair and maintenance of works and plant (including renewal of retorts), &c., cost £9787. The value of the coal and coke used for the steam-boilers was £674. The expenses in connection with the carburetted water gas were: Oil (360,636 gallons), £3756; and wages and fuel, £2514. The distribution expenses totalled to £6639; and rents, rates, and taxes, to £4588. The salaries of the cashier, accountant, collectors, &c., amounted to £3631; and general establishment charges and incidental expenses, to £741. Three minor items made the total expenditure £139,531, which left a balance of £40,954 to be carried to the net revenue account.

CROYDON COMMERCIAL GAS COMPANY.

Issue of Additional Debenture Stock.

An Extraordinary General Meeting of the above Company was held last Wednesday, at the Offices, Katherine Street, Croydon—Mr. C. Hussey, J.P., in the chair—for the purpose of sanctioning the issue of 5 per cent. debenture stock.

The Secretary (Mr. W. J. Russell) having read the advertisement convening the meeting,

The Chairman remarked that, although the meeting was called an extraordinary one, he thought it would be purely formal, so far as the shareholders were concerned, because, when he had read the resolution he would have to move, they would see there was but one opinion that could be held on the subject—namely, that it would be for the benefit of the Company and the shareholders alike. The resolution was as follows: "Resolved that, under the powers conferred upon the Company by the Company's Acts of Parliament, the Directors be and are hereby authorized to raise all or any part of the money which the Company are, or shall from time to time be, authorized to raise on mortgage or bond, by the creation and issue of debenture stock bearing interest at the rate of not exceeding five pounds per cent. per annum, instead of, and to the same amount as, the whole or any part of the money which may for the time being be owing by the Company on mortgage or bond, or which they may from time to time have power to raise on mortgage or bond; and that such debenture stock be offered for sale by public auction or by tender, in such amounts, in such manner, at such times, and subject to such terms and conditions of sale, as the Directors shall from time to time determine." As the proprietors would see, the Directors proposed to alter the rate of interest on, and the form in which they intended to issue, debentures. Up to the present, they had all been 4 per cent. mortgage debentures for a limited number of years. They began in 1880 with £500, redeemable in five years; the average price realized being £100 11s. 4d. for each £100. In 1888, they issued £2500 at 4 per cent. for a similar period; and they fetched £100 17s. 5d. per cent. Last year, they issued £5250 at 4 per cent., redeemable in ten years; and these averaged £104 14s. The last issue had taken place in the present year—£8500 at 4 per cent., redeemable in ten years. The average price was £104 5s. 3d.—not quite so good as in 1893. Not long ago, the Crystal Palace District Gas Company issued a good amount of 5 per cent. perpetual debenture stock at about £150 for each £100; showing the great advantage of irredeemable over redeemable stock. The South Metropolitan Gas Company were offering £25,000 of 5 per cent. stock; and £157 per £100 was the minimum for which any tender would be received. He thought the Croydon Company stood in as good a position as the former, and was quite as sound as the latter Company. The Directors' object was to get as much capital as possible for the amount issued, so as to delay going to Parliament. Supposing they obtained £150 for every £100 of stock, they would only be paying about 3¾ per cent. interest for the money.

Alderman Layton, J.P., in seconding the motion, remarked that he thought the course proposed by the Directors a very prudent one.

Mr. G. Barrett said he had no objection to the proposition itself; but he could see, as a Carshalton shareholder who had unpaid shares, that the calling up of those shares would be deferred to a very far distant future.

Another Shareholder said he was afraid they would not be able to deal with the stock on the Stock Exchange.

The Chairman, replying to these observations, stated that, in obtaining their recent Act, they gave an undertaking to the Corporation, prior to the Act being passed (or they would have opposed it), that, before they made a call on the Carshalton shares, they would first call up the Company's loan capital. This promise they made in the interests of the Company; and there was no doubt it would be in the interests of the Carshalton shareholders. As to dealing with the stock on the Exchange, they were taking steps to bring this about, as he promised at the last meeting. But he would remind the shareholders that no stock that did not amount to £50,000 could be quoted.

The motion was then carried unanimously; and the proceedings concluded with a vote of thanks to the Chairman for presiding.

SINGAPORE GAS COMPANY, LIMITED.

An Extraordinary General Meeting of this Company was held last Thursday, at the Cannon Street Hotel, E.C.—Mr. Samuel Spencer in the chair.

The Secretary (Mr. R. M. Christie) read the notice convening the meeting; and the Directors' report and statement of accounts, an epitome of which appeared in the Journal for the 20th ult., were taken as read.

The Chairman, in moving their adoption, prefaced his remarks by saying that since the last meeting, the Directors had lost their old colleague, Mr. F. A. M. Nicol; and he was sure that the sympathy of the shareholders would be given to his wife and family. In his place, the Board had elected Mr. R. G. Rice; and he (the Chairman) felt confident that their choice would meet with the approval of the shareholders. Mr. Rice was a barrister, and had the necessary knowledge of the work of the office, as he was a Director of two very successful Gas Companies. He was the son of a former Director; and he (the Chairman) was sure Mr. Rice would prove a valuable help in the deliberations of the Board. Since the shareholders last met, their affairs had not shown any signs of improvement. But this they must have been prepared for, as the position was pretty much on all fours with the previous half-year's working; and the fact that they had come out no worse was to some extent satisfactory. With the excessively low rate of exchange, averaging 2s. 2d. per dollar—the lowest in the history of the Company—they had almost anticipated a worse result than was shown by the accounts. They had still to go through the current half year; and the rate of exchange could not be looked upon as improving—in fact, it had dropped that week to 2s. 0¼d., which was 2d. less than the rate for the past half year. Therefore, the average for the present six months might turn out slightly less than in the period under review; and so the Directors did not see that they could expect, at the next meeting, a much better return than the one now presented. It might be slightly better, as, from July 1 last, the price of the gas supplied to the private consumers had been increased from $3 to $3¼ per 1000 cubic feet; but the public lighting would continue to Christmas at the rate of the past half year. This, however, he hoped with every confidence, would bring them to the end of their troubles. From the New Year, he trusted that a better state of things would commence, as they had concluded with the Municipality a contract to charge $3 20c. per month for the public lamps; and the moderate profit from this source, and the increased charge for private lighting, would, he hoped, enable the Directors to resume the payment of dividends after the next meeting. The best thanks of the Directors were due to the shareholders for their patience during the two years they had now been without dividends; and he felt sure that, if the same consideration was extended to them for a short time longer, they would have the pleasure of again beginning to pay dividends, and, what was of far greater importance, seeing the shares at par value. The balance shown in the accounts the Directors again, of course, recommended should be carried forward. It would be noticed that the loss on exchange was £2684, being £209 more this half year; and for the whole year, it reached to the enormous amount of £5159. It was most painful that they could not alter their position in this respect to the extent of a single penny. The amount for sundry creditors was some £2600 more than in the last balance-sheet; but this was more than covered by the coal in stock and the cash in hand. Repairs showed a decrease of £113; and the other items stood about the same as in the preceding half year. With regard to the revenue, the figures worked out to a similar amount, as the increased sale of coke and tar about covered the loss from gas and meter rental. Practically, the result was the same as in the previous six months; being, in fact, only £45 less. Their Manager (Mr. H. W. Smith) reported that everything at the works was satisfactory and the plant in good repair, and that after Christmas the Company would be supplying 1000 street-lamps. Mr. Smith considered the business was improving; and he further stated that

several new large consumers would be connected during this year Respecting the leakage, it was returned at 2 per cent. In conclusion, the Chairman repeated that his colleagues thought with him that, with the New Year, they would turn the corner of the disappointing and disastrous period they had been passing through; and they earnestly hoped the near future would bring them more prosperous and lasting dividend-paying times.

Mr. W. T. Batten, in seconding the motion, also held out hopes that soon—not perhaps at the next, but at the following meeting—they would be in a position to again pay a dividend. Their sole difficulty was that of exchange. There was nothing in the working that any one of the Directors was in the least dissatisfied with. Mr. Smith was doing his best. The increase in the price of gas had caused the number of consumers to drop; but not to the extent they had anticipated. The advance in the price to the Municipality was a matter upon which they might congratulate themselves, as they had obtained what they wanted, and had not fallen out with the Municipality. With the increase in the price of gas and the improved receipts from tar and coke, if the dollar did not drop lower (and he did not see how it could do so), the Company would soon be in a better position, and be able to pay a dividend.

Mr. E. Riley asked the Chairman to inform him, for the purpose of comparison, what was the amount of the revenue a few years ago.

Mr. Dyer expressed his regret at the death of Mr. Nicol, and congratulated the Directors upon now having Mr. Rice as a colleague. While the shareholders did not like to see the item of sundry creditors standing at such a large figure as £5713, at the same time he saw that the value of the stock of coal was £2000 more; and at the present low price of coal, it was wise to increase the quantity in hand. With reference to the Chairman's hopeful remarks as to paying a dividend, he said he should prefer rather that the Company should get absolutely out of debt, and obtain a fair start before doing so.

Mr. C. H. Robins, having remarked that he trusted the shareholders would soon be receiving a dividend, as he did not see much good in carrying on the business if they were not going to get anything out of it, proceeded to comment upon various items in the accounts. Referring to a small amount expended in extensions during the half year, he said he ventured to think that, until they saw themselves in clearer water, no more money ought to be spent in Singapore. It had previously been suggested that they should act as a trading company with the view of counteracting to some extent the loss on exchange. The balance of feeling had always been very strongly against this; but it did not follow that, because a London Company could not profitably take up such trading, a Singapore Company could not.

Mr. T. A. Greene spoke at some length upon the question of the depreciation of silver, and concluded his remarks by saying that it was clear from the balance-sheet that the Company were really in a much better position than they had been of late years.

The Chairman, in reply, also dealt with the silver question, remarking that, in his judgment, it had now reached the bottom. Upon the subject of trading, he stated that he had had the opportunity of consulting with two very eminent gentlemen who were well qualified to speak upon the matter; and one of them declared it would simply be speculation upon speculation, while the other said it would be a most unwise step to take. With reference to the money spent upon extensions, he stated that the Municipality had the power of calling upon the Company to lay new mains if they wanted to put up additional lamp-posts. In this connection, he also mentioned that, about two years ago, one of the sons of Mr. Thomas Newbigging, of Manchester, visited the Company's works; and he expressed the opinion that they were in admirable order. With regard to the cash at the bankers in London and Singapore (£2239), he said that they were bound to keep a good balance, as they had to pay part of the freight on coal here and part at Singapore. Alluding to Mr. Riley's inquiry, the Chairman said that, when Mr. Batten went out to Singapore, the receipts per month averaged about $7800; while now they came to nearly $9000. There were 17,000 houses in Singapore; and they were supplying gas to less than 600 of them. As to the item of sundry creditors, last half year it stood at £3100; while this year it was £5713. This was accounted for by the fact that they had now a large quantity of coal in stock; and he thought this was prudent policy on the part of the Directors.

Mr. Batten, replying to a question by Mr. Dyer, stated that they had one dozen prepayment meters on trial at Singapore; but they had not yet heard definitely the result. He did not think there were any possible means they had not tried in endeavouring to increase the number of the consumers. They had a strong competitor in kerosene oil, which was cheaper at Singapore than in England. At the present time, they were enriching the gas with kerosene.

The motion was unanimously carried.

On the proposition of the Chairman, seconded by Mr. Rice, a resolution was passed altering section 52 of the Articles of Association by inserting after the words "in the month of April" the words "or in the month of May," so that the annual ordinary general meeting may be held in future in either of those months.

The services of the Chairman and Directors were suitably acknowledged, on the motion of Mr. Greene, seconded by Mr. Riley; and the Secretary, Manager, and the staff were also thanked for their attention to the interests of the Company, on the proposition of Mr. Dyer, seconded by Mr. R. P. Keys.

The New Water-Works for Kendal.—The Corporation of Kendal having decided to augment their water supply at a cost of £30,000, a piece of land, which includes a tarn called Fisher Tarn, has been bought from Lord Henry Bentinck, at a cost of £4500. Against this purchase, 56 large ratepayers petitioned the Corporation, on the ground that the tarn was not a suitable gathering area, and contained peat. They asked for the Engineer's (Mr. G. F. Deacon's) report upon other sites, naming Longsleddale and Hutton Park. Mr. Deacon forwarded a long report commenting upon the petition, and assuring the Corporation that the Fisher Tarn scheme was the cheapest and best. At a special meeting of the Corporation a few days since, it was decided to adopt the Fisher Tarn scheme; and the agreement between the Corporation and Mr. Deacon for carrying out the work was sealed.

THE JOHANNESBURG SANITARY BOARD AND THE LIGHTING COMPANY'S WORKS.

The Legal and Finance Committee of the Johannesburg Sanitary Board have recently been inquiring into the question of purchasing the Johannesburg Lighting Company's works; and the outcome of their investigation and negotiation was a recommendation that the Company's assets and property should be acquired for the sum of £160,000. The matter came before the Board for consideration on Oct. 30.

Mr. H. Solomon moved a resolution accepting the recommendation of the Legal and Finance Committee, and giving authority for the raising of a loan for the purpose, and any further loan that might be required to complete the works, not exceeding £200,000. Speaking in support of his motion, Mr. Solomon said the Committee were appointed to go into the matter, to confer with Sir James Sivewright, who represented the Company, and to see what arrangements could be made with them. He thought it was a matter for congratulation that the Board had arrived at the stage when they could take over one of the most important concessions it was possible to hold in the country. He dilated upon the importance of having the town well lighted, and proceeded to argue that concessions of this kind ought never to have been given away to private individuals; but he admitted that perhaps there were certain circumstances which, at that time, justified the Government in doing so. However, it was their bounden duty to try and get these concessions back as quickly, and as cheaply, as possible. He must say this, that Sir James Sivewright had behaved in a very fair spirit; and he thought that the amount of £160,000 at which they had arrived could be considered a fair valuation. He (Mr. Solomon) found that an amount of more than £200,000 had been expended by the shareholders upon their undertaking. Of course, a certain amount had been written off for depreciation and other purposes; and a great deal of the money had been expended in carriage, which, as they all knew, at the time the Company was started—viz., in 1888—was particularly expensive. At first no profit at all was made. A lot of money was put into the concern by the promoters and shareholders; and, owing to the circumstances which prevailed in all new undertakings, it was found that up to a certain time—viz., about eight months ago—the Company did not pay. Now, he believed, the Company were in a fair position to pay their way; and the Sanitary Board had the opportunity of acquiring a most valuable concern. It was bound to pay handsomely for any outlay which the ratepayers might choose to expend on it. The object the Board had in view, he continued, was to have the town lighted at the last possible cost to the ratepayers. The concession for gas was for 99 years, and for electric light 10 years, with the option of 89 years, so that, as far as that was concerned, the Board were perfectly protected. The Lighting Company were willing to do business with the Board; but at the same time they had offers from one or two financial houses in Johannesburg who were willing to reconstruct the Company. This meant, as regards the ratepayers, that, whereas they had now a chance of getting the works for £160,000, if they allowed the opportunity to slip out of their hands, they would have to pay at least 75 per cent. more if they wished at any future time to acquire the undertaking. He did not remember any previous occasion upon which the public and the press were so unanimous for any point as they were as to the desirability of the town purchasing the lighting concession. With the opening of the new railway, they would be able to buy coal at the pit's mouth, in the Middelburg district, at 11s. per ton; and adding carriage—say, 11s.—and agency 2s. 6d., made the price delivered in Johannesburg 24s. 6d. or 25s. It was calculated that the supply of gas would exceed the present quantity by three times; and additional plant would have to be erected to overtake this increase. He gave details to show that the total expenditure for the increased supply would come to £1600 a month. The monthly consumption of coal he placed at 600 tons, which would yield 4,800,000 cubic feet of gas; or, allowing 800,000 cubic feet for loss, &c., 4,000,000 cubic feet, which could be sold at 12s. 6d. per 1000 cubic feet. This was a rate which everyone in Johannesburg would think very low; the present Company charging 21s, which was practically a prohibitive rate. The proposed price would realize £2500 per month; coke would fetch £600 more; and tar (3000 gallons at 1s.) would bring in £150—making a total of £3250. Deducting the working costs of £1620, Mr. Solomon figured out a profit of £19,800 per annum. With regard to the electric light, he was positive they would be able to supply double the quantity used now. The monthly expenses he figured out at £904 10s. With regard to the income, he took 32,000 units at 1s. 3d., against 1s. 9d. charged at present; and this would yield £2000. With the rent of meters, he calculated that there would be an annual profit of £13,635. Taking the gas and electric light together, Mr. Solomon predicted a total profit of £33,435 yearly to the town. Of course, they would have to increase the plant, and put everything in thorough working order; so that they would have to ask the ratepayers for £30,000 or £40,000 in addition to the purchase price of £160,000. From inquiries which had been made, they would be able to raise whatever money they required in the town. There would be no difficulty whatever in getting money at par; and whatever favourable terms they obtained from any banking institution, Sir James Sivewright had told them he was prepared to give them ½ per cent. better. So he thought they were likely to make very good terms for the town. He did not think they would be able to get money for less than 5 per cent. They would thus have to provide £13,000 per annum, allowing for sinking fund for 30 years; and depreciation would also have to be provided for. Their Valuer (Mr. Pistorius), as far as he remembered, valued the permanent plant at £100,000; and taking 10 per cent. on this for depreciation represented £10,000, or a total annual sum to be provided of £23,000. After providing for interest, sinking fund, and depreciation, there would thus remain a net profit of £10,435. He thought the members would agree that this was a very satisfactory state of affairs. He did not believe they would ever have such an opportunity of acquiring an undertaking which was really required by the town on the same terms as it was offered to them at present. It suited the Company no doubt to make acceptable conditions with the

Sanitary Board at the present moment. He was satisfied that, if the Board did not close the bargain now, they would make a serious mistake, and a mistake for which the ratepayers in future would have reason to blame them.

Mr. DONOGHUE, in seconding the motion, said he thought their best thanks were due to the Committee for the way they had gone into this matter. The £200,000 might not be all that was required; but for that amount they could make Johannesburg a town fit to live in.

Mr. HERZBERG thought Mr. Solomon had been over-sanguine in his estimates. Mr. Holt proved to them at the Committee meeting that it was not possible to have anything like three times the present consumption of gas. But even if they earned only a fair percentage on the amount they would have to expend, he thought they were right in buying up the Company; for the simple reason that they must have the town better lighted than at present. They must also reduce the price; but he did not think they would be able to lower it to 12s. 6d. He had gone into the figures; and he thought that at 15s. or 16s. they would be able to pay interest and provide a sinking fund.

Mr. FILMER next asked whether the Town Engineer (Mr. Aburrow) confirmed Mr. Solomon's figures, and approved of the purchase.

Mr. ABURROW said that, if his opinion was worth anything, he certainly approved of the purchase. He would not bind himself to all the figures; but he thought they might reckon on the price of gas being reduced to 15s.

The motion was unanimously agreed to.

A Meeting of the English shareholders was held last Thursday, at the offices of Messrs. Davis and Soper, No. 54, St. Mary Axe, at which—subject to some arrangement with the preference shareholders—the policy of the sale referred to above was approved.

COMBINATIONS AMONG TRADERS.

In a recent issue of the *Newcastle Daily Chronicle*, there was an article, under the significant title of "Screwing Down Prices," dealing with the letter of Mr. George Livesey on the subject of "Combinations of Traders in Gas-Works Materials," which appeared in the JOURNAL on the 13th ult. (p. 930). Recognizing the justness of the principle that in all disputes the "other side" are entitled to a hearing, we reproduce the article.

The trades Mr. Livesey selects for censure are meter makers, tube makers, and builders of gasholders. Mr. Livesey is against such combinations, because, although they may act fairly, their "inevitable effect is to stereotype prices, and paralyze enterprise and invention." We do not object to his condemnation of such combinations. Their tendency is to produce the results he describes. But Mr. Livesey has surely forgotten that his own Company and other London Companies have resorted to the identical practice he so vigorously censures. They have made gas making a close monopoly. A few years ago, there were sundry Gas Companies on the south side of the Thames, which have all been absorbed by the South Metropolitan. This monopoly may have been advantageous to the South London ratepayers; but it destroyed the unrestricted competition that Mr. Livesey contends for among meter makers and tube makers. If competition is good for the makers of the articles that gas companies use, it ought also to be good for the makers of gas itself. There is no gas manager in the country for whom we have more respect than for Mr. Livesey. The able and intrepid manner in which he has conducted the affairs of his Company has won for him widespread and deserved admiration and respect. But, in his anxiety to keep down prices among tradesmen who supply gas-works with goods, he seems to have forgotten the policy pursued by the London Gas Companies—his own among the rest. Mr. Livesey no doubt knows that the Gas Companies are accused of being great adepts at "sweating." They have carried the practice so far that they have nearly destroyed the businesses of some of the tradesmen who deal with them. But the worm even will turn. And the unfortunate meter makers and tube makers have turned, and, according to Mr. Livesey, are combining to get better prices. They would probably not have done this if they had not been driven to it by the exactions and the "sweating" of the gas companies. Mr. Livesey questions the honesty of some of the tradesmen he enumerates. This is delicate ground. Gas managers are not impeccable. They are sometimes accused of insisting upon commissions on the goods supplied to their companies. Salford and other cases are not yet forgotten. Gas managers, therefore, ought to be chary before impugning the honesty of meter makers and others, who are only simply seeking to do for their trades what the London Gas Companies have done for their shareholders. The policy of combination may be unwise; but the integrity of the meter makers, tube makers, and builders of gasholders is as free from reproach as the integrity of gas managers, or even directors.

INCREASED STOREAGE AT THE SALISBURY GAS-WORKS.

On Monday last week, a new two-lift gasholder having a capacity of 400,000 cubic feet, which has been erected at the works of the Salisbury Gas Company by Messrs. E. Cockey and Sons, Limited, of Frome, from plans prepared by Mr. Norton H. Humphrys, Assoc.M.Inst.C.E., F.C.S., the Company's Engineer, was brought into use for the first time; gas being turned therefrom into the mains by Master C. G. Fullford, nephew of the Chairman (Mr. G. Fullford), in the presence of several Directors and other gentlemen. From a report presented on the occasion by Mr. Humphrys, we learn that the Directors decided to retain the making of the foundations, which were to be carried out by himself; and Mr. Kite, a builder, of Fisherton, was engaged for the purpose. The work was commenced on Oct. 3, 1893; and the foundations were completed in February last. Meanwhile Messrs. Cockey had been preparing the gasholder and iron tank; and they immediately proceeded with the erection thereof. Although some 60 artizans and labourers were engaged, the men happily escaped without accident. By retaining part of the work in their own hands, the Company were enabled to give employment to a large number of local men in making the foundations, &c.; and Messrs. Cockey, in addition, engaged local labour to a large extent. The unreliable nature of the ground necessitated a strong foundation. This was secured by the construction of a solid block of concrete over the whole area. For this purpose, 1200 tons of flints, 425 tons of sand, and 270 tons of Portland cement were required. The tank is constructed of cast-iron plates joined together with bolts and iron cement, and hooped outside with 12 strong iron bands. The diameter is 105 feet, and the depth 25 feet; and it comprises 1150 plates, 20,000 bolts, and 15 tons of cement. When filled with water to the overflow, it contains 1,357,660 gallons, or about 6060 tons weight of water. Each lift of the holder is 24 feet deep; and the diameters of them are 103 ft. 3 in. and 101 ft. 6 in. respectively. The weight is 141½ tons. The tank plates weigh 350 tons; the external framing, about 120 tons. Consequently, there are nearly 620 tons of iron in all. The total weight on the foundation is about 6700 tons. The large volume of water encountered in forming the foundation was successfully dealt with by means of centrifugal pumps, driven by a 4-horse power steam-engine, supplied with steam from the boilers at the gas-works. Frequently 40,000 gallons of water had to be dealt with before commencing work in the morning. The tank was filled with water by the same machinery from a well sunk on the site for that purpose. The whole of the work was carefully tested, with satisfactory results. The total cost has not exceeded the original estimate of £8000. Mr. Humphrys acknowledges the assistance he received in carrying out the work, from the Company's General Manager (Mr. T. Hardick), from the Contractors' Manager and his Foreman (Messrs. Ramsden and Rollinson), and from Mr. Kite and his son.

INCREASED STOREAGE FOR THE TODMORDEN GAS-WORKS.

About two months ago, the Chairman of the Gas Committee of the Todmorden Local Board (Mr. W. Jackson) announced that the Committee had accepted the tender of Messrs. C. and W. Walker for a new gasholder. Last Thursday, a formal commencement was made of the work of installing it, by the cutting of the first sod by Mr. Alderman Hoyle (in the absence of Mr. Jackson). The holder to be erected will be 130 feet in diameter, in two lifts each 30 feet deep, with provision for a third lift. As at present projected, it will hold 800,000 cubic feet of gas; but, when fully completed, its capacity will be 1,200,000 cubic feet. The excavations and banking have been contracted for by Mr. B. Lumb. The total cost is put down at £10,000. After the ceremony, the company repaired to the Shannon and Chesapeake Inn, where the event was celebrated. Mr. Alderman Hoyle, in proposing "Success to the New Holder," coupling with the toast the names of Messrs. Walker and Lumb, expressed the hope that Messrs. Walker might continue their business successfully for some time to come, for he was sure they would not like anybody else to add the third lift to the fine holder they were about to erect at Todmorden. Mr. H. Howell, responding on behalf of Messrs. Walker, said that the holder about to be supplied to the Board would be one of the most modern construction; and he had no doubt it would meet all their requirements. On occasions like the present, one was inclined to look back and see what progress had been made in gasholders. In 1803, the first holder—a "stupendous" structure 8 feet in diameter and 6 feet high (capable of holding 300 cubic feet of gas) was made. Recently, however, they had put up a magnificent structure capable of holding 8 million cubic feet of gas. He must congratulate the Board on their foresight in going in for increased gasholder accommodation, as it was only by stepping out in this way that the Gas Manager (Mr. G. E. Saville) would be able to compete with the electric light. But with increased storeage, gas would still remain in the forefront, and electricity would be nowhere for domestic lighting purposes. Mr. Lumb also responded. He said he intended to commence the excavations on the following Monday and to proceed as expeditiously as possible. The toast of "The Health of Mr. Saville, Manager of the Gas Department," having been cordially honoured, Mr. Saville gave some figures showing the progress of the gas undertaking since his first connection with it in 1865. Then the consumption in the month of November was 2,441,000 cubic feet. In 1870 he went away for twelve years; and the first November after his return the consumption was 4,707,000 cubic feet. Two years ago the November consumption had risen to 8,533,000 cubic feet; last year it was 10,504,000 cubic feet; and for the month ending on the following day (the 30th ult.), the consumption would have been 12,250,000 cubic feet. So that, as far as a gasholder was concerned, they had reached such a state that it was scarcely a matter of choice, but one of compulsion. On an average, they were making 480,000 cubic feet per day. Reverting to his appointment under the Gas Company in 1882, he said he found the price of gas to be 4s. 8d. per 1000 cubic feet. He was pleased to know that since then a reduction had taken place; and after the 1st of January next consumers would be supplied with gas at 2s. 11d. He believed there was a brighter prospect for gas now than ever there was. He was very gratified to find that his services were appreciated; and he looked forward to still greater success for the concern. Other toasts followed; and the proceedings then closed.

Portsmouth Water-Works Company.—At the half-yearly meeting of this Company last Thursday, the Directors reported that the available balance on the profit and loss account was £17,507, from which they recommended the payment of the full statutory dividends, which, after the usual deductions, would leave a balance of £3282 to be carried forward. During the half year, 1182 yards of new street service-pipes were laid, and 265 additional premises were connected with the mains—making the total number of premises now served 35,616. The average daily supply of water for all purposes during the half year was 5,672,000 gallons. The revenue account showed that the income for the half year was £25,450.

ELECTRIC LIGHTING NOTES.

The Fleetwood Improvement Commissioners recently applied to the Local Government Board for sanction to the borrowing of £11,816 for carrying out an electric lighting installation; and an inquiry was held in regard to the matter by Mr. R. Walton last Thursday. The Fleetwood Tradesmen's Association and others supported the application; but the Railway Company strongly opposed it, on the ground that there were other schemes which were far more pressing—notably the sewerage.

The Harrow Local Board have provisionally accepted a tender submitted by Messrs. Crompton for an electric lighting installation for the town. The figures they quote are £8762 for plant, &c., and £1686 for maintenance, as against the Engineer's (Mr. Hawtayne's) estimates of £9300 and £2092 respectively. A report has been prepared for circulation among the ratepayers, in which the Board refer to the desirability of local authorities having in their hands "such undertakings as water, gas, and electric light, so that the profits should go to the benefit of the whole body of ratepayers." It also asserts that the scheme will be worked at a profit, and states that every part of the district is to be lighted.

Mr. R. Walton was engaged at Birkenhead last Wednesday in inquiring into an application which had been made to the Local Government Board by the Town Council for permission to borrow £20,000 for the purposes of electric lighting. Mr. Shoolbred, who is advising the Corporation, explained their intentions with regard to electric lighting, and said it was proposed to supply a district embracing a mile radius from the generating station, which would be situated in a position to take in all the principal thoroughfares of the borough. Low pressure would be used, so that accidents such as those which had occurred in London and elsewhere, where high pressure was in use, would be almost impossible. It was proposed to fill the street-boxes with oil, as was done in Brighton, where they had never had an accident of any sort, or even extinction. There was no opposition.

After much delay, the electrical installation of the Cardiff Corporation has been completed; and the circuits were tested on the 16th ult. The Corporation are now prepared to accept applications for electricity from shopkeepers and residents in the area of supply; but at present there has been a very discouraging demand. Some of the principal thoroughfares, however, are to be lighted by means of four series of Siemens' arc lights. The actual cost of the works so far executed has not, it is understood, yet been published; but the following are the original figures: Mains, £8000; transformers, underground chambers, &c., £2000; arc lights, lamp-posts, &c., £3000; buildings and chimney stack, £5600; boilers, £2500; engine, steam-pipes, and condensers, £3500; accessories, £5000; site credited at £1500; railway siding, £400; contingencies, £1000. The Consulting Engineer was Mr. W. H. Massey; but the work has been carried out entirely by the Corporation, under the direction of the Borough Engineer (Mr. W. Harpur). The buildings cover an area of 80 square feet. At the meeting of the Lighting Committee on Nov. 20, the subject of extending the installation beyond the limits of the present area was briefly discussed; and the Borough Engineer was instructed to draw up an estimate and specifications for the new suggested district.

The London County Council have lately had before them once more the question of the periods to be assigned for the repayment of loans for electric lighting undertakings. They have decided that for land, buildings, culverts, bare copper mains, and royalty licences, the time allowed shall be 50 years; and for all other purposes 20 years. This decision was arrived at in connection with the loan to the St. Pancras Vestry, for which the approval of the Treasury had to be sought. The latter thought that no period should be granted which was disproportionate to the life of the works; and, in order to arrive at a definite understanding on this point, the Finance Committee of the Council investigated, with the assistance of the Engineer (Mr. A. R. Binnie, M.Inst.C.E.), the question of the durability of each portion in greater detail than they had hitherto done. They were advised that the following division of the work in the St. Pancras case might be taken as being fairly accurate: £3800 for meters and connections, lasting 5 years; £4000 for batteries, lasting 8 years; £2000 for arc lamps and cooling apparatus, lasting 10 years; £13,000 for boilers, covered mains, &c., lasting 15 years; £24,000 for engines and dynamos, lasting 20 years; £33,000 for culverts and bare copper mains lasting 40 years; £9000 for buildings, lasting 60 years; and £10,500 for land—total, £99,300. The Committee thought it might fairly be argued that, as Parliament had extended the maximum period of loans for electric lighting purposes from 30 to 50 years, it was intended that at any rate some portion of the outlay should be spread over the longer period. On the other hand, it could not be considered right to allow such a time for the repayment of expenditure of so short-lived a nature as that for meters and apparatus of that kind. They therefore came to the conclusion that the Council might be advised to adopt the two periods specified.

At a recent meeting of the Montrose Town Council, the proposed agreement between the Council and the Scottish House-to-House Electricity Company, Limited, for the introduction of the electric light into the borough was under consideration. According to one clause, the Company undertake to pay to the Council the following proportions or shares of the net profits of the undertaking: During each year of the first ten years, a sum equal to 20 per cent. of all profits over and above 6 per cent. on the capital invested; and during each of the remaining years that the undertaking is not acquired by the Council, a sum equal to 10 per cent. of the profits until the Company earns 6 per cent. on the capital invested, and to 20 per cent. of all profits over and above 6 per cent. These payments are to made within three months of the date of each annual balance, with interest of 5 per cent. on such proportions or shares of profit until paid. The clause also contains a provision of the credit to be given to the Company for interest on capital, &c. By the next clause, the Company, on obtaining their Provisional Order, and throughout the whole term thereof while the undertaking is in their own hands, agree to supply electric current for public and private lighting purposes at a charge not exceeding a rate equal to 25 per cent. less than the present price of gas as supplied by the Montrose Gas Company—viz., 4s. 7d. per 1000 cubic feet—calculating light for light; and they further agree that the maximum or limitation of price to be charged in respect of the supply of electricity shall be 8d. per Board of Trade unit. The Council are to support the Company's application for a Provisional Order; and on this being obtained, they will put up to public auction a suitable site for the works. The Convener of the Electric Lighting Committee (Mr. Whiteman), in moving the adoption of the agreement, said he thought it showed the very excellent way in which the Company had met the Council. Mr. H. Hall remarked that he expected the maximum price of the light would have been much lower than 8d. per unit. Provost Mitchell said he did not think the Company gave any indication of charging the maximum; the only guarantee being that their light would be cheaper than gas. Bailie Stone pointed out that in one clause of the agreement, it was stipulated that the rate was to be 25 per cent. less than the present price of Montrose gas; and he said he would just like to ask whether the phrase "light for light" was a definite thing or not. In what way had they the means of seeing that this part of the bargain was carried out? Mr. Whiteman, in reply, said this could not be done; but if the light were cheaper than gas, any person could take it or not as he pleased. The Company were to come in a legitimate manner, and did not intend to "fleece" the community. Bailie Stone asked how they could enforce the guarantee that there was to be "light for light." In the event of a breach of the agreement, would it be the town or any private individual who would take the case up? The Clerk said that would be for them to settle at the time. The Provost said that, if the condition were not carried out, proceedings would be taken against the Company. The agreement was then unanimously adopted and signed by the members of the Council present; and the Company have since given notice of their intention to apply for a Provisional Order. Commenting on this matter, a local paper points out that, according to the agreement, the Company must give at least as good a light as the present gas, or even a better one, at 25 per cent. less than the existing price. The writer goes on to remark that there are those who maintain that a profit cannot now be made out of electric lighting, and who are very dubious about even the 25 per cent. less estimate. He thinks it is pretty certain that the town need not look for profit, if this is only to be forthcoming after 6 per cent. is assured to the Company.

WATER-WORKS EXTENSIONS AT WALLASEY.

The Wallasey Local Board have completed some new water-works in the Seaview Road, Liscard; and last Tuesday the supply was formally turned on to the district, which, for several months past, has suffered from an inadequate supply of good water. The new works have been carried out under the superintendence of Mr. H. Ashton Hill, the Gas and Water Engineer to the Local Board. The Contractors for the works were Vivian's Boring and Exploration Company, Limited, of Whitehaven, for the boring and making the well; Messrs. Fawcett, Preston, and Co., of Liverpool, for the machinery; and Messrs. Lawrence Marr and Son, of Liverpool, for the buildings. There are two pairs of beam engines, fixed side by side and independent of each other. They are of about 120-horse power; and each engine is capable of delivering 60,000 gallons of water per hour from a depth of 160 feet, and forcing it to a height of 100 feet, including friction; making a total effective height of 260 feet. The buildings are substantial and convenient; and the entire work has been carried out in a thoroughly satisfactory manner. The ceremony of starting the works was performed by Mr. T. Snape, M.P., in the presence of a numerous company. Previous to declaring them open, he tasted the water from the new well; the goblet he used being presented to him by Mr. Hill, as a memento of the occasion. Mr. Snape congratulated the Local Board and the inhabitants upon the completion of this addition to their water supply, and upon the excellence of the water. It was, he said, interesting to notice that, during the last thirty years, the population had grown from 10,723 in 1861 to 33,094 in 1891. He was informed that from the old and new works combined, there could be obtained, by using the engines there for not more than twelve hours a day, a total supply of 1½ million gallons; and it was possible to increase this. The company afterwards drove to the Seacombe Hotel, where they were entertained to dinner by the Contractors for the works. Mr. John Davies, the Chairman of the Gas and Water Committee of the Local Board, presided. Among the toasts subsequently proposed was that of the health of the Engineer; and Mr. Hill, in responding, gave some details with regard to the new works. He stated that the well was 12 feet in diameter, and 173 feet deep, measured from the engine-house floor. The bore-hole was connected to the well by means of a steel tube 18 inches in diameter and 20 feet long; a valve being placed in the well, actuated by rods passing up to the top of the well. The machinery consisted of a pair of high-pressure, surface-condensing, expansion, compound pumping-engines, actuated by steam at 80-lbs. pressure, the necessary pumps, and three steam-boilers. The engines were capable of raising 60,000 gallons of water per hour against a total head, including friction, of 260 feet. The immediate result of the opening of the new works was that the intermittent supply which had prevailed for some few months past was replaced by a constant supply, and that the starting of the new engines had enabled the Committee to dispense with the original well, which had become brackish. He also mentioned, with regard to the new gas-works, that these had been necessitated by the continued rapid growth of the population. The works had been laid out on such a scale as to meet all reasonable requirements for a number of years. It was quite certain that, if the district developed in the future at the same rate as heretofore, further additional plant would have to be provided on the land now possessed by the Board for gas-works purposes.

Reduction in Price.—The Gas Committee of the Nelson Corporation have reduced the price of gas in the Wheatley Lane district to 3s. 6d. per 1000 cubic feet net; and we learn that there is a probability that before long the consumers in the borough of Nelson will get a reduction of 3d. per 1000 cubic feet.

CAPE TOWN DISTRICT WATER COMPANY, LIMITED.

The Ordinary General Meeting of this Company was held last Wednesday, at Winchester House, Old Broad Street, E.C.—Mr. J. S. PRINCE in the chair.

The report and accounts for the year ending June 30, which were noticed last week, having been taken as read,

The CHAIRMAN said it was a great pleasure to him to be able to report that the Company had continued to steadily progress during the year. The gross revenue amounted to £10,411; but he should explain that in this sum there was included £1000 received from the Municipality of Cape Town for a temporary supply of water during the last few months of a very dry season, when there was almost a water famine in Cape Town. He did not think there was a prospect of deriving any immediate benefit in this way again from the Municipality, because that body were now constructing some very large water-works. The Company's mains, however, were connected with those of Cape Town; and should it be necessary at any time to afford assistance, they could turn on the water as soon as required. The shareholders would notice that the cost of pumping and engine charges exceeded those of previous years by £700. This was caused chiefly by the continuous pumping from the Albion Spring during the dry season, and also because the mountain springs from which they supplied by gravitation had also been affected. It was a matter for congratulation that the Albion Spring showed little diminution compared with its average yield. The sum of £800 had been placed to reserve; and this, it was expected, would be partly used for further alterations and improvements in the engines, which would effect a very great saving in fuel. Upon each occasion that he had had the pleasure of addressing the shareholders, he had expressed the opinion that the Company would ultimately prove a financial success; and he thought that the following figures would prove that they were progressing steadily year by year: In the twelve months ending June 30, 1891 (which was practically the first year of the Company's working), the revenue was £3364; June 30, 1892, it was £5353; 1893, £7529; and 1894, £10,411. This showed that the revenue for the past year exceeded that of the first year by about £7000; or, deducting the £1000 received from the Cape Town Municipality last year, the increase had been, as near as possible, £2000 a year. The number of houses supplied on June 30, 1892, was 832; 1893, 1206; and 1894, 1544. In the district supplied, there were still about 1182 houses which were not connected with the Company's mains; and the advantage of having a water supply had greatly stimulated the building of new houses. Of the 1182 houses referred to, 465 could be supplied without further outlay, and the greater proportion of the remaining 717 could be served at a moderate expenditure on the extension of mains. These figures did not, of course, include Woodstock, which the Company supplied with water in bulk. The Directors considered that they had every reason to be satisfied with the result of the year's operations, which enabled them to recommend for the first time a dividend of 1 per cent. He moved the adoption of the report and accounts.

Mr. OHLLSON, a local Director, stated that he was one of the largest shareholders in the Company; and he was perfectly satisfied that they might look forward to a steady increase of business in the future. He believed that before five years had elapsed, they would be able to dispose of all the water the Company possessed; and he was also satisfied that they would be in a position to pay a good dividend.

Mr. A. BULL seconded the motion, which was carried.

The dividend recommended having been declared, the retiring Director (Mr. Prince) and the Auditors (Messrs. Deloitte, Dever, Griffiths, and Co.) were re-elected.

JOHANNESBURG WATER-WORKS COMPANY, LIMITED.

The Annual General Meeting of this Company was held recently in Johannesburg, under the presidency of Mr. S. B. Joel, in the absence of the Chairman (Mr. Barnato). In their report, the Directors stated that the profit and loss account showed that the revenue amounted to £55,548, and the expenditure to £25,484; leaving a profit of £30,064 on the year's working. With a balance of £3562 brought forward, there was an amount of £33,626 at the disposal of the Company. This had been apportioned as follows: Debenture interest to June 30, 1894, £4200; dividend No. 5, of 6¼ per cent. on £250,000, £15,625; depreciation, amount written off machinery, town service, &c., £5093; carried forward to next year, £8707—total, £33,626. During the year the Company constructed a new high-service reservoir on the highest point of the Yeoville Estate. This reservoir is of solid masonry, in two sections, and has a capacity of 3,000,000 gallons. The storeage capacity had been increased by 24,000,000 gallons during the year. This brought the total up to 47,200,000 gallons—an additional reservoir (No. 4), with a capacity of about 12,600,000 gallons, having been constructed, as well as the high-service reservoir mentioned above. The Chairman, in moving the adoption of the report, referred to the financial position of the Company, which, he said, the Board considered to be very satisfactory—the total profit showing an increase of £6173 on that of the year 1892-3. Passing on to deal with the improvements effected in the working arrangements, he pointed out that two years ago the Company's storeage capacity was 1,305,800 gallons, while it was now 47,293,000 gallons—showing an increase of 45,887,200 gallons. No one would, he thought, be disposed to question the wisdom of that policy; but if any argument were needed, it would be found in the present state of affairs, when they were passing through a drought almost unequalled in South African annals, in spite of which the Company had not failed in their supply, besides having no less than 27 million gallons stored in addition to the daily yield at the springs. Less than two years ago, the Company's pumping power was 30,830 gallons per hour; while it was now 92,300 gallons, or an increase of 61,170 gallons per hour. Less than two years ago, the pressure was only sufficient to rise to a head of 42 feet; while the maximum was now 271 feet, with an average over the whole of the hydrants in the town of a head of 202 feet. The average daily yield of the springs was 862,000 gallons for the past twelve months—the daily consumption during that period being 486,000 gallons; thus proving that the Company had abundance for all possible requirements. These were facts which could not be gainsaid; and he, in common with every member of the Board, confidently challenged the closest examination of them. But they were fully alive to the fact that, with the phenomenal increase of population, additional sources of supply might at no distant date become necessary; and he could assure the proprietors that the Board had this in view, and that their interests would be fully protected. These facts spoke for themselves; and they proved that the Company had fulfilled their promise to keep pace with the requirements of the town. As to the charge for water, the Company had never once availed themselves of the provisions of the concession. Their policy, on the other hand, had always been to supply water at as low a rate as possible, commensurate with a fair return to the shareholders. The Directors were now considering the question of a reduction in the tariff. He could not conclude without referring to the assistance the Directors had received from the London Board, as well as from the Manager, Secretary, and staff in Johannesburg. Sir J. Sivewright seconded the motion, which was carried.

BRADFORD CORPORATION WATER SUPPLY.

Lord Hothfield and His Silsden Water Rights.

Some time ago, a claim was made against the Bradford Corporation by Lord Hothfield, for damages for an alleged breach of agreement by them in regard to furnishing a supply of water for all domestic and agricultural purposes to his Lordship's tenants on Silsden Moor. The matter came before the High Court of Justice, with the result that it was remitted to Mr. W. T. Ridley, Q.C., an Official Referee; and he recently investigated it at the Bradford Town Hall. The facts were as follows: In 1854, the Bradford Water Company were anxious to obtain parliamentary sanction to laying down a conduit through land belonging to Sir Richard Tufton, Lord Hothfield's predecessor. The advertisements relating to the proposal were published in 1853; and Sir Richard called in Mr. Angus Nicholson, to whom he gave instructions to report how far his interests would be affected by the proposed works. This gentleman considered the result would be that numerous springs on the farms would be drained by the conduit. Sir Richard therefore opposed the Company's application; and an agreement was ultimately entered into by them to supply the tenants of the Silsden Estate with all necessary water in compensation. This agreement was confirmed in the Bradford Water-Works Act of 1854. In 1855, the Corporation took over the effects and responsibilities of the Company; and a long correspondence ensued, which resulted in the Corporation entering, in 1862, into the agreement which formed the subject of the dispute. In pursuance of this, a system of reservoirs, pipes, and troughs was constructed, by which the farms were supplied up to 1893. In May, 1893, the Corporation, through their Water Engineer, repudiated the agreement, on the ground that the farms were all above and beyond the water-works, and that their natural supply of water was not affected. The case for Lord Hothfield was presented by Mr. T. W. Chitty; that for the Corporation, by Mr. T. Milvain, Q.C. At the close of Mr. Chitty's opening speech, the Referee pointed out that, if the Corporation had interfered materially with the water of the farms, there was no doubt they were responsible under the agreement. Mr. Milvain replied that the question was one of fact. If the fact was proved, the Corporation could not escape liability; but he said they could not be responsible for any additional farms or houses on the estate. Mr. Chitty contended that the estate was exactly as it was in 1854, with the exception of one house. The Referee remarked that, if the district suddenly became a populated one, there would be a right to have the agreement rectified. Argument ensued as to the liability of the Corporation under the agreement. Mr. Milvain said they had discovered that there was an ample independent supply, which had never been interfered with; yet they did not object to maintain the present works. What they did object to was to make an additional reservoir which would provide Lord Hothfield with a superabundance of water, while the rest of the county was starving from drought. They were prepared to make up the natural supply, and no more. Witnesses were called. In the course of the examination of one of them, a private consultation was in progress outside the chamber between the Town Clerk (Mr. W. T. M'Gowen), the Chairman of the Water Committee (Alderman W. Holdsworth), and Lord Hothfield's advisers, at the close of which Mr. Milvain announced that terms had been arranged between the parties. The Referee expressed his pleasure at hearing it. Mr. Chitty subsequently stated that the agreement they had come to was that the Corporation should carry out and continue the works constructed in 1863, and keep them in a proper and efficient condition. The Referee said he thought that the settlement arrived at fully carried out the agreement entered into when the works of the Corporation were projected, and that it was not intended that Lord Hothfield should have been guaranteed against drought; but that the supply abstracted from him by the Corporation should be made good. The Corporation had frankly taken up the position that this was their liability; and there was no more to be said. He thought they were in the right, seeing they had so many interests to look after, in meeting this inquiry in the way they had done, and making it sure they were really liable to the application of the agreement. He hoped that, the Corporation having accepted the position, friendly relations would prevail between the parties in future. The proceedings then terminated.

Gas-Works Extensions at Walsall.—At a special meeting of the Walsall Town Council last Thursday, the Town Clerk stated that the Gas Committee had the opportunity of purchasing 6 acres of land for £1750 adjoining the gas-works; but the Local Government Board doubted their power to grant permission without a Provisional Order. As the Board had not yet given their final answer, and Friday was the last date for applying for the Order, it was thought that it should be applied for as a precautionary measure. A resolution was unanimously passed empowering the Town Clerk to apply for the Order.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

Still more of Falkirk litigation over the proposed gas transfer, as your "Legal Intelligence" will show. And there is more coming, for the action to reduce Mr. Barr's appointment, which was referred to in the discussion before their Lordships of the First Division of the Court of Session, is being prepared. There is a talk also of there being a possibility of the decision of last Tuesday being appealed to the House of Lords. Surely the lawyers are fond of work, when they are so diligent over such small matters as they have elected to hang up the arbitration upon. It is, in fact, difficult to see what benefit will accrue to anyone over all their litigations, unless it be to the lawyers themselves. The citizens of Falkirk could not, so far as can be seen, gain much benefit by the removal of Mr. Barr from the position of Oversman. The business of the arbitration would be, if the parties elected, in open court; and, after what has taken place, I should say it ought to be. If therefore any bias were manifested, it could be easily checked; or it could be dealt with by public opinion, or reduction of the award. Indeed, the latter is already one of the possibilities of the situation, for it was mentioned by one of the Judges, and was not contradicted by the Counsel for the Corporation. With that possibility looming in the future, and with the possibility too of Mr. Barr taking proceedings to clear up the mystery about the services he rendered to the Corporation, there is a goodly prospect of legal intervention before the transfer can be effected. To say the least, the statement which was made at the bar by the Counsel for the Corporation, but which was not admitted to the record, was within a very short degree of slander, if it be not true; and if Mr. Barr is content to rest under it, it will only be because his name is sufficiently strong to withstand the imputation it to my mind conveys—that he had acted in a way which it is difficult to characterize otherwise than as the following of a double course. Hitherto the case has only been a sort of skirmish on the flank of the question. Those of your readers who are not familiar with Scotch legal remedies will not understand the function of the Bill Chamber. It is a Court of Summary Procedure, to which application is made to have stopped, temporarily, any proceeding which may be complained of. If the Judge is satisfied that a case has been made out which is worthy of trial, he passes the note, which has the effect of sending the case into the Court of Session to be tried on its merits. If he considers that there has been nothing laid before him which is worth trying, he refuses to pass the note. That was what was done in this case. The Corporation have now the opinions of four Judges against them, to the effect that nothing has been said which would entitle them to declare Mr. Barr disqualified. That ought to be sufficient for them; but they are not satisfied. They have failed to get their action introduced to the Court through the Bill Chamber; and they accordingly fall back upon the method of raising an action in the Court of Session direct, in which they will sue for reduction of Mr. Barr's appointment, and, I suppose, for interdict of his acting. Meantime, the three months are again running; and if they delay bringing their action for a week or two, the time remaining will be too short to carry through such an important proceeding as an arbitration over a gas transfer. The last information I have is that the community of Falkirk are taking alarm at the amount of litigation which is being developed; and that there is a proposal to hold a public meeting, in order to bring pressure to bear upon the Corporation, in the way of stemming the flood of legal proceedings. I question if that would be an advisable step, because the members of the Corporation might say afterwards that they had been hampered by the action of the community. Those who might organize a meeting, would thus take over the responsibility for the success or non-success, from the Corporation point of view, of the arbitration—a responsibility which at present the members of the Corporation are popularly supposed to bear, but which is really borne by their Counsel. It is always the plea, in such cases, that they acted on the advice of Counsel; and it will be so here.

Mr. James Thomson, the Manager of the Inverness Corporation Gas-Works, reported to a meeting of the Gas and Water Committee of the Corporation on Wednesday that he had now completed the scheme of extension and renewal in connection with the gas-works and plant which was begun two years ago. At that time they had only storeage capacity to the extent of 170,000 cubic feet; while their daily make of gas was sometimes 280,000 cubic feet. They had increased the storeage by 370,000 cubic feet. As a consequence, they were now able, with 10 men and 32 retorts, to produce more gas than they did before with 14 men and 40 retorts. Formerly their purifiers were too small; and these had now been enlarged, with the result that the gas was being sent out better purified. They had built a new purifier-house, and had laid an enlarged main across the river to serve the west side of the town. All the plans and specifications for the works were prepared by Mr. Thomson, who has also supervised the construction of them. His estimate for the entire work was £9800; and the actual cost has been £9934—the increase being due to the Commissioners being required to pay the wages of the iron contractor's men while they were in idleness enforced by the contractor for the excavation of the gasholder tank not being able to keep the tank dry. The keeping of the cost within such near limits to the estimate, is a very satisfactory feature of the business. It is calculated that Mr. Thomson's services have saved £600 to the town; and in appreciation of them, the Committee unanimously agreed to raise his salary from £230 to £250, as from May 15 last.

The Edinburgh and Leith Gas Commission, as reconstituted after the elections, held their first meeting on Monday. There was little business to transact, except to elect Committees, and the like. Bailie Kinloch Anderson was re-appointed Convener of the Works Committee, a post which he holds with distinction; and Mr. Younger was re-elected Convener of the Finance and Law Committee. The Commissioners agreed to sell some of their properties on the west side of New Street, in which their laboratory is situated, to the North British Railway Company, who require the site for the extension of their Waverley Station, at the price of £2100. Both works show a satisfactory increase in the output of gas since May 16; the Edinburgh works having risen from 281,928,000 to 298,642,000 million cubic feet, and the Leith works from 136,065,000 to 144,369,000 cubic feet.

An extensive scheme for the grading of officials' salaries is being considered by the Corporation of Glasgow. A Committee who have been considering the subject have issued their report, in which it is proposed that the first-class surveyors in the Assessor's and Water and Gas offices will have a minimum salary of £170 per annum, rising by yearly increments of £10 to a maximum of £200; the minimum for second-class surveyors is £130, and the maximum, rising by annual increments of £7 10s. to £160; third-class surveyors of the first division will have a minimum of £105, and a maximum of £120; and for those in the second division the minimum will be £80, and maximum, £100—the annual increases in both these cases being £5. The grading for collectors is as follows: The principal indoor collectors in connection with the water, gas, and police departments—minimum, £180; maximum, £200; annual increment, £10. First-class indoor collectors—minimum, £150; maximum, £170; annual increment, £10. Second-class do.—minimum, £125; maximum, 140; annual increment, £7 10s. Third-class do.—minimum, £90; maximum, £120; annual increment, £5. First-class outdoor collectors—minimum, £105; maximum, £120; annual increment, £5. Second-class do.—minimum, £80; maximum, £100; annual increment, £5. In the case of inspectors in the various departments, the grading of salaries proposed is: Principal inspectors in Water Engineer's, sanitary, and public works—minimum, £170 per annum; maximum, £200; annual increment, £10. First-class inspectors—minimum, £120; maximum, £157 10s.; annual increment, £7 10s. Second-class inspectors—minimum, £80; maximum, £115; annual increment, £5. Third-class gas and water meter inspectors of the first division—minimum, £70; maximum, £90; annual increment, £5. Second division meter inspectors—minimum, £70; maximum, £90; annual increment, £5.

The proposal of the leaders of the Scotch miners, that an advance of 6d. per day in wages should be asked, has not been supported by the men; but notwithstanding this the leaders have resolved to keep the resolution on their books, and during the present month to continue to press for an advance. This was done in the face of the acknowledgment that the price of coal is falling; and I suppose the resolution is simply being kept standing to cover the retreat of the leaders.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Dec.* 1.

Sulphate of Ammonia.—A declining market has prevailed during the whole of the week; and any improvement under existing circumstances is, for the present at all events, problematical. The statement has been widely circulated that some considerable stock—the existence of which is an open secret—is about to be realized; and this has not been conducive to the disposal of spot parcels, which have been rather more freely offered. Consumers appear to be imbued with pessimistic views as to the future, and there has consequently been almost an entire lack of business for forward delivery. Prices have been very irregular; the lowest seem to have been taken for Leith delivery. The closing value is about £11 12s. 6d. at the usual ports. Nitrate is unchanged at 8s. 9d.

LONDON, *Dec.* 1.

Tar Products.—If anything, benzols are firmer. There is evidently a demand for them at prices quoted below. The surplus benzols are going into consumption for fortifying gas; and if it continues at the present rate, benzol may see higher prices. Stocks in makers' hands were never lower than they are to-day. Pitch is firm for prompt delivery; but for forward delivery, buyers will not pay anything like to-day's prices. Ordinary creosote oils are somewhat slack; but for liquid and grease oils there is more request, and prices are better. Anthracene is held strong. Carbolic acid is also moving off freely; and it is remarkable that, with such an excellent demand, its value does not improve. To-day's prices are as follows: Tar, 17s. to 21s. Pitch, prompt, 40s.; forward, 35s. Benzol, 90's, 1s. 1½d.; 50's, 1s. 1½d. Solvent naphtha, 1s. 2d. Toluol, 1s. 2½d. Crude naphtha, 5d. Creosote, liquid, 2½d.; ordinary, 1⅝d.; salts, 20s. Cresylic acid, nominal, refined, 1s.; brown, 9d. Carbolic acid, 60's, 1s. 5d. Anthracene, "A," 1s. 1½d.; "B," 10d.

Sulphate of Ammonia goes from bad to worse. The collapse in prices is due largely to the anxiety of makers to sell; while there is undoubtedly a strong "bear" movement going on. Business during the week has ranged between £11 10s. and £11 15s., less 3½ per cent.; while gas liquor is offered at 7s. 3d. to 9s. 3d.

COAL TRADE REPORTS.

From Our Own Correspondents.

Lancashire Coal Trade.—Except that the spell of severe weather which has set in during the last few days may tend to brisk up the demand for the better qualities of round coal, there is no material change in the position generally throughout this district. Collieries continue on not more than three or four days per week; and all descriptions of fuel are plentiful in the market. For the better qualities of round coal, quoted prices are maintained; although clearance sales are occasionally made at special rates, and some of the inferior descriptions of house-fire fuel have been slightly reduced. Common round coals do not meet with any better demand for iron-making, steam, and general manufacturing purposes; and they continue extremely low in price. At the pit mouth, best Wigan Arley can be bought at 10s. 6d. to 11s.; Pemberton four-feet and seconds Arley, at 9s. 6d. to 10s.; with common round coals ranging from 6s. 6d. for steam and forge qualities, to 7s. and 8s. for descriptions suitable for house-fire purposes. Engine fuel remains a general drug upon the market, with all sorts of prices taken to get rid of anything like quantities, either for prompt sale or for contracts. Common Lancashire slack can be readily bought at 3s. to 3s. 6d., with the better qualities about 4s. 6d. to 5s. at the pit mouth; whilst slack from other districts continues to

be offered at prices which do not leave more than 1s. 6d. to 2s. per ton at the pit. The shipping trade remains in a depressed condition, with common round coals offering at about 8s. to 8s. 3d., and better qualities quoted about 8s. 9d. per ton, delivered at the Garston Docks or the High Level, Liverpool. [With reference to the remarks of our correspondent, in the JOURNAL for the 20th ult., on the subject of the Belfast coal contract, the total quantity was 80,000 tons, of which 60,000 tons were secured by a Yorkshire colliery, and the remainder by a Lancashire coal company.—ED. J.G.L.]

Northern Coal Trade.—Though there is an increased demand for gas coal, it is scarcely up to the usual level at this time of the year; and the request for other kinds of coal is a very disappointing one in the north-eastern district, and many of the collieries are now working short time. In best Northumbrian steam coals the prices are lower; and in some quarters it is expected that still further reductions will have to be resorted to to induce orders enough to give the pits fuller time. Best steam is now obtainable at 9s. 6d.; and second qualities at about 9s. per ton f.o.b., with discounts to obtain orders in some instances. Steam smalls are also more plentiful now; and can be had at from 3s. 9d. to 4s. per ton f.o.b. Gas coal is in larger demand; and the deliveries for the next three weeks will be about the heaviest for the year. But the production is fully adequate; and the strong competition that there is between the chief producing districts tends to keep the prices down. The price varies from 7s. to 8s. per ton f.o.b. Manufacturing coals are dull. The contracts for the chief railway in the North are now in the market; and they are expected to be allotted at a reduction on the prices that ruled last year. Coke is dull; and very good Durham coke can be had at from 13s. to 14s. per ton f.o.b. Gas coke is being treated for over next year; and it seems probable that for large quantities for manufacturing purposes, the price will be about 6d. per ton below that of the contracts now running out.

Scotch Coal Trade.—Trade is not improving. The shipping of coal to the Baltic ports has practically finished. As values have come down, masters are hopeful that they may get back some of their Mediterranean customers; but they are afraid that they will be only partially successful, as their English competitors are reducing prices. Several masters who have been interviewed admit that their prices could stand to be further reduced. The men are working steadily five days a week; and the result of the large output and the slackness of the demand is that stacking is taking place at the pit heads. Prices are still receding. The quotations are: Main, 7s. 6d. per ton f.o.b. Glasgow; ell, 8s. to 8s. 3d.; splint, 8s. 6d.; and steam, 8s. 9d. The shipments for the week were 135,277 tons—a decrease on the preceding week of 16,624 tons, and of 37,760 tons as compared with the corresponding week of last year. For the year to date, the total shipments have been 4,645,923 tons—a decrease, as compared with the same period of last year of 2,643,977 tons.

The London County Council and Gas-Meter Rents.—Dr. Collins has placed upon the *agenda* of the London County Council notice of a motion to refer to the Public Control Committee to consider and report "whether the meter-rents charged by the gas companies are or are not in excess of what are sanctioned by the statute," and to "make suggestions accordingly."

Rotherham Corporation Gas and Water Departments.—The financial statement of the Gas Department of the Rotherham Corporation for the six months ending Sept. 29 last shows that the income amounted to £9227; and the expenditure, to £8166—the gross profit being £1061. But deducting loan charges and the proportion of public lighting, the approximate net loss is £1993. The financial statement of the Water Department for the six months shows an estimated income of £4769; and an expenditure of £2094—the gross profit being £2764. But deducting the annual loan charges, the net profit is £22.

Failure of the Electric Light at Great Yarmouth.—At ten o'clock last Friday night, the entire installation of electric lighting in the public thoroughfares of Great Yarmouth suddenly failed; and the town was plunged in darkness for about five minutes. According to a paragraph in a local paper, dissatisfaction is felt at the public lighting—or, perhaps we ought to say the want of it—since electricity has been brought into use in this department of the municipal service; and the attention of the Town Council is directed to the darkness and consequent discomfort, and we may add danger, prevailing in many places where the gas has been cut off because the electric light is in the vicinity. In numerous instances the electric lamps are too far distant to be of any service. We are told that "if the Electric Lighting Committee or the Lamp Committee, or both, would kindly make a tour of the borough during the dark nights, they would realize how just is the claim of a large number of the inhabitants to at least a restitution of the gas in some localities, and to an additional supply of light of some sort in others."

Saltash Water Supply.—At a special meeting of the Saltash Town Council recently held, the Water Committee presented a report on the subject of the water supply of the town. The Committee had been in negotiation with the Plymouth Corporation and the Great Western Railway Company; and they recommended that agreements should be entered into for a supply of water from Plymouth, the main to be carried across the River Tamar by way of the railway bridge. The Committee estimated that £2250 would have to be borrowed; and, at 3½ per cent., £300 per annum would be required for payment of principal and interest. For three years the Plymouth Corporation were willing to supply a minimum of 8 million gallons of water yearly; but at the end of that time the minimum would be 13 million gallons. Alderman G. Adams said the Committee believed the scheme would be self-supporting; and Mr. E. D. K. Hawke stated that it would be less costly than the Tremartor scheme, which the Committee had considered as an independent source of supply for Saltash. Mr. A. Widdecombe calculated that there would be a loss of £130 a year; and he said that, though they would pay the Plymouth Corporation £3352 in fifteen years, they would at the end of that time be no better off than now if Plymouth ceased to supply them. They had better have a scheme of their own. The Committee's recommendation was, however, adopted by an overwhelming majority.

Newhaven and Seaford Water Company.—The revenue account of this Company for the year ending Sept. 29 last shows a profit of £977. The balance available for dividend is £952. From this a dividend of 5 per cent. per annum, free of income-tax, has been declared.

Water-Works Extension at South Blyth.—On Monday, the 19th ult., Sir Matthew White Ridley, Bart., M.P., together with representatives of local public bodies, visited the South Blyth Water-Works, and performed the ceremony of turning on a supplementary supply to the town reservoir. The increasing population has for some time rendered a more adequate provision desirable; and to meet the growing requirements, operations were instituted to secure an additional quantity of water from Shankhouse. The result has been in every way satisfactory; and the prospects of a scarcity are now regarded as remote.

Death from Lead-Poisoning at Mossley.—Mr. Barstow, Coroner for the southern division of the West Riding of York, held an inquest at Mossley last Wednesday concerning the death of Abel Marland, a stonemason, aged 45. After evidence had been given, the jury returned a verdict to the effect that Marland died of acute peritonitis and lead-poisoning. They also added to the verdict the following rider: "The jury desire to call the attention of the Joint Water-Works Committee to the unwholesome condition of the water supply to the borough of Mossley, and regret that steps have not been taken at an earlier period to remedy this defect."

The Gas and Water Supply of Brighouse.—A meeting of owners and ratepayers was held at Brighouse yesterday week, to consider and determine upon the promotion of a Bill in the next session of Parliament, to empower the purchase and transfer to the Corporation of the undertaking of the Rastrick Gas Company, as well as for vesting in the Corporation the water undertaking heretofore belonging to the Brighouse and the Rastrick Local Boards, enlarging the water limits so as to include the whole of the borough, and for the purchase of a portion of the Halifax gas and water undertaking in Hove Edge. The Town Clerk explained the various clauses in the Bill, and said that power was sought to borrow for gas-works purposes £83,000 (including £50,000 for the purchase of the Rastrick Gas-Works), and for water £10,000. A resolution consenting to the Bill was passed, with only two dissentients.

The "Penny-in-the-Slot" System for Burnley.—At a meeting of the Gas Committee of the Burnley Corporation last Thursday, a report on the prepayment meter system was presented by the Gas Engineer (Mr. J. P. Leather). In this he pointed out that there were about 5000 houses in Burnley to which mains and services had been laid, but in which gas was not used. There was evidence that the occupants of these houses would be willing to burn gas, if it could be obtained by small payments. He suggested that the prepayment meters should be fixed free, but that a premium should be charged on the ordinary price of gas, in lieu of meter-rents and to cover the cost of getting in the money. He put the cost of collection at about 1s. 8d. per annum per meter; and to meet all charges the price should be 7d. extra per 1000 cubic feet of gas. From a return he had prepared, Mr. Leather showed that in 28 towns the charge was 7¼d. more than to the ordinary consumer; but, in the majority of cases, new services, fittings, burners, &c., were supplied free. The Committee decided to adopt the system, and to charge for the gas supplied and the hire of the prepayment meters at the rate of 1d. per 25 cubic feet of gas consumed.

General Gas Company of France.—The result of the working of this Company for the past financial year, as shown by the report presented to the shareholders at the annual general meeting on Nov. 29 was a total of 3,555,889 frs., as compared with 2,773,159 frs. in the year ending June 30, 1893. Of the former sum, however, 736,948 frs. represented the profit realized by the sale of shares in the Austrian General Gas Company, and was therefore exceptional. Deducting this sum, the actual working profits were 2,818,941 frs.—an advance of 45,782 frs. on those for the preceding year, notwithstanding a higher rate of exchange and a diminution in the selling price of coke. Adding to the 3,555,889 frs. the balance carried forward (160,385 frs.) brought it up to 3,716,274 frs. Deducting general expenses, the statutory dividend and the reserve, Directors' fees, &c., there was left a disposable balanee of 1,318,928 frs. Of this sum, 300,000 frs. were taken to pay an additional dividend of 7 frs. 50 c. per share, 850,000 frs. were placed to the reserved profits fund, and the balance (168,928 frs.) was carried forward. The dividend declared was at the rate of 32 frs. 50 c. per share (500 frs.). The Company, of which M. Albert Ellissen is the General Manager, have ten stations in France and nine in Belgium, besides large holdings in several gas undertakings.

The New Water Scheme for Barnsley.—A well-attended meeting of ratepayers of Barnsley was held on Monday last week to consider the promotion of a Bill in Parliament in the next session, to empower the Corporation to obtain a further supply of water. The Mayor (Alderman Woodcock), who presided, stated that the increasing wants of the district had become so great, and with the experience of the past summer, the Council were convinced that it was time to enter into negotiations for a further supply of water. Their last venture at Ingbirchworth had been a great success, both from a sanitary and financial point of view; while the purity of the water had been satisfactory. He moved a resolution expressing the consent of the meeting to the promotion of the Bill. Alderman Raley, in seconding the motion, gave some details as to the cost and the results which it was hoped would be derived from the proposed scheme, as noticed in the JOURNAL last week (p. 1035). Concerning the announced opposition of Rotherham to the project, he said that he did not know whether or not they were in earnest. While Barnsley were only applying for a tributary of the River Don, Rotherham were endeavouring to appropriate the whole of the Little Don and its tributaries. Though their opposition might have prevailed against Wakefield, it would not be successful now. It was a question as to whose was the best claim. Barnsley considered they were the first in the field. They had to supply the out-townships; and he believed, if the risks were even greater than they were, they ought not to allow this chance to slip out of their hands. There was a little opposition to the motion; but in the end it was carried unanimously.

Porthcawl Water Company, Limited.—A Company has been registered under this title, with a capital of £10,000, in £10 shares, to acquire and carry on the Porthcawl Water-Works, situate in the parish of Newton Nottage, Glamorganshire. As will be seen by our "Parliamentary Intelligence," application is to be made next session for a Provisional Order to authorize the acquisition of the works.

Stratton and Bude Water Supply.—An inquiry was recently held at Stratton by Colonel Hasted, R.E., an Inspector of the Local Government Board, relative to a complaint that the Stratton Rural Sanitary Authority had failed to provide a supply of water for Stratton and Bude. The case for the memorialists was that there is a population of 1880 in the villages; and that it is greatly increased during the summer season. Of 396 houses, 234 are without water. Stratton is wholly dependent upon wells; while in Bude the supply from these is supplemented by the Shute, which has a delivery of only 2 gallons per minute. The wells are often contaminated; and outbreaks of typhoid have occurred. Several schemes of water supply have been considered, but none has been carried out. The Rural Sanitary Authority stated that they had abandoned one or two proposals because the suggested sources of supply were doubtful, and others had been postponed in order that their sufficiency might be better tested. At the close of the evidence, the Inspector remarked that they had had a rather straggling defence for the Rural Sanitary Authority.

The Large Leakage of Water at Nelson.—Reference was made in the JOURNAL for the 20th ult. to the large leakage of water which has been going on at Nelson. The matter has given rise to all kinds of rumours as to the destination of the water; but it seems that there were no grounds for imputing dishonesty to the consumers. By far the larger quantity of the lost water appears to have gone absolutely to waste. The leakage was discovered in a very interesting way. The town is served by the Ogden stream and the Coldwell reservoir, the water from which flows into a service reservoir on Marsden Heights. During the early summer, the Chairman of the Water Committee (Mr. Astley) noticed that the water of Coldwell was continually falling. In view of the fact that the town was being served with the Ogden water, this seemed extraordinary, especially as wet weather prevailed, and a large quantity of rain fell. It was explained that the smaller bulk of water in Coldwell was made up by an increased quantity in the service reservoir at Marsden; and that the water flowed from Coldwell, and rose at Marsden every night. It was decided to test this; and late in August the Mayor (Alderman Hartley), with Mr. Astley and others, went to Marsden Height at midnight to see the water flow in. They watched for an hour or an hour and a half, and in that time the water sank an inch. The question then was: If the water sinks an inch in an hour and a half, how much will it rise during the night? It was obvious at once that the water was running away somewhere. The consumption during the night was practically nothing, and instead of the Marsden reservoir filling with the water from Ogden and Coldwell, the level was actually sinking. This settled the point. Mr. Newton, the Corporation's Consulting Engineer, was called in, and tests were arranged. It was then found that about 400,000 gallons was being lost every day along the lines of pipes. No big leak was discovered anywhere; but there was a considerable number of small leaks all over the town. Four waste-water meters were put in position at the main branches of the system; and then the work of finding the leaks and repairing them was pressed on. It was discovered that water was running through the sewer-pipes. A very large quantity found its way into the sewerage system; and, mingling with ordinary matter, it was treated at the sewage farm. It is stated that some thousands of gallons more than the proper quantity have been so treated. The work of finding the faulty places in the pipes is, of course, not easy. But it is being vigorously prosecuted; and so far with much success. The whole matter has been investigated by a Sub-Committee of the Water Committee, who have reported thereon.

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

(For Stock Market Intelligence, see ante, p. 1064.)

Issue.	Share	When ex-Dividend.	Dividend or Div. & Bonus.	NAME.	Paid per Share	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p. c.	**GAS COMPANIES**				£ s. d.
590,000	10	11 Oct.	10½	Alliance & Dublin 10 p. c.	10	19—20	..	5 5 0
100,000	10	,,	7½	Do. 7 p.c	10	13⅜—14½	+⅛	5 3 5
300,000	100	2 July	5	Australian (Sydney) 5 % Deb.	100	105—107	..	4 13 4
220,000	5	14 Nov.	6½	Bombay, Limited	5	6—6½	..	5 0 0
40,000	5	,,	6½	Do. New	4	4¼—4¾	..	5 9 6
380,000	Stck.	15 Aug.	11½	Brentford Consolidated	100	233—238	+3	4 16 8
180,000	,,	,,	8½	Do. New	100	183—188	+3	4 10 5
220,000	Stck.	28 Sept.	11	Brighton & Hove Original	100	215—220	..	5 0 0
888,500	Stck.	30 Aug.	5	Bristol	100	115—120	..	4 3 4
320,000	20	28 Sept.	11½	British	20	48⅝—49½	..	4 10 10
50,000	10	30 Aug.	11½	Bromley, Ordinary 10 p. c.	10	21⅞—22½	..	5 2 2
51,510	10	,,	8½	Do. 7 p. c.	10	16⅝—17½	..	4 17 2
328,750	10	14 Nov.	2	Buenos Ayres (New) Limited	10	6⅞—7	..	2 17 1
200,000	100	2 July	6	Do. 6 p. c. Deb.	100	101—10[illegible]	..	5 15 5
150,000	20	12 July	8	Cagliari, Limited	20	25½—26⅛	..	6 0 8
550,000	Stck.	11 Oct.	13	Commercial, Old Stock	100	272—277	+5	4 13 10
165,000	,,	,,	10	Do. New do.	100	200—2[illegible]5	+5	4 17 7
160,762	,,	14 June	4½	Do. 4½ p. c. Deb. do.	100	132—137	..	3 5 8
800,000	Stck.	14 June	13	Continental Union Limited	100	243—248	+1	5 4 10
200,000	,,	,,	10	Do. 7 p. c. Pref.	100	210—215	..	4 13 0
535,000	Stck.	30 Aug.	5	Crystal Palace Ord. 5 p.c. Stk	100	115—120	..	4 3 4
486,090	10	27 July	11	European, Limited	10	22½—23½	..	4 13 7
354,060	10	,,	11	Do. Partly paid	7½	16—17	..	4 17 1
5,646,590	Stck.	15 Aug.	12	Gaslight & Coke, A, Ordinary	100	250—254	÷2	4 14 5
100,000	,,	,,	4	Do. B, 4 p. c. max.	100	105—110	..	3 12 9
665,000	,,	,,	10	Do. C, D, & E, 10 p.c. Pf.	100	277—282	..	3 10 10
30,000	,,	,,	5	Do. F, 5 p. c. Prf.	100	130—135	..	3 14 1
60,000	,,	,,	7½	Do. G, 7½ p. c. do.	100	200—205	..	3 13 2
1,300,000	,,	,,	7	Do. H, 7 p. c. max	100	182—187	+2	3 14 11
463,000	,,	,,	10	Do. J, 10 p. c. Prf.	100	275—280	..	3 11 5
476,000	,,	,,	6	Do. K, 6 p. c. Prf.	100	169—170	..	3 10 7
1,061,150	,,	14 June	4	Do. 4 p. c. Deb. Stk.	100	128—131	..	3 1 0
294,850	,,	,,	4½	Do. 4½ p. c. do.	100	135—140	..	3 4 3
908,000	,,	,,	6	Do. 6 p. c. do	100	185—190	+2½	3 3 2
3,800,000	Stck.	14 Nov.	12	Imperial Continental	100	224—229	−1	5 4 10
75,000	5	14 June	6	Malta & Mediterranean, Ltd.	5	5—5⅛	..	5 9 1
360,000	100	1 Oct.	5	Met. of Melbourne, 5 p. c. Deb.	100	110—112	..	4 9 3
541,920	20	14 Nov.	5	Monte Video, Limited	20	15—16	..	6 5 0
150,000	5	29 Nov.	8	Oriental, Limited	5	7—7⅛	+⅛	5 6 8
60,000	5	13 Sept.	7	Ottoman, Limited	5	4¼—4½	..	7 7 4
166,870	10	31 Jan.	2	Pará Limited	10	1½—2	..	10 0 0
420,000	100	2 Nov.	6	People's Gas of Chicago—1st Mtg. Bds.	100	100—105	..	5 14 3
500,000	100	1 Dec.	6	and Do.	100	95—100	..	6 0 0
150,000	10	11 Oct.	6	San Paulo, Limited	10	9—9½	..	6 6 4
500,000	Stck.	30 Aug.	15½	South Metropolitan, A Stock	100	337—342	..	4 10 8
1,350,000	,,	,,	12	Do. B do.	100	283—288	+1	4 3 4
260,000	,,	,,	13	Do. C do.	100	292—297	+2	4 7 6
750,000	,,	12 July	5	Do. 5 p. c. Deb. Stk.	100	157—162	..	3 1 9
60,000	Stck.	30 Aug.	11½	Tottenham & Edm'nton, "A"	100	220—225	..	5 2 2
				WATER COMPANIES.				
746,011	Stck.	28 June	10	Chelsea, Ordinary	100	290—295	..	3 7 10
1,719,514	Stck.	11 Oct.	8	East London, Ordinary	100	232—237	+2	3 7 7
654,740	,,	28 June	4½	Do. 4½ p. c. Deb. Stk.	100	152—156	..	2 17 8
700,000	50	14 June	8½	Grand Junction	50	120—124	..	3 8 7
708,000	Stck.	15 Aug.	12	Kent	100	304—309	..	3 17 8
1,043,800	100	28 June	9½	Lambeth, 10 p. c. max.	100	270—274	..	3 9 4
406,200	100	,,	7½	Do. 7½ p. c. max.	100	209—214	..	3 10 1
330,000	Stck.	28 Sept.	4	Do. 4 p. c. Deb. Stk.	100	132—135	..	2 19 3
300,000	100	15 Aug.	12½	New River, New Shares	100	384—388	..	3 2 6
1,000,000	Stck.	27 July	4	Do. 4 p. c. Deb. Stk	100	140—145	..	2 15 2
902,300	Stck.	14 June	6	S'thwk & V'xhall, 10 p. c. max.	100	170—173	..	3 8 7
126,500	100	,,	6	Do. D 7½ p. c. do.	100	160—165	..	3 12 9
1,155,066	Stck.	14 June	10	West Middlesex	100	280—284	..	3 10 5

*Ex div.

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HYDRAULIC AND GAS ENGINEERS,

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They have completed Exhausters to the extent of 32,000,000 cubic feet passed per hour, which are giving unqualified satisfaction in work.

Makers of GAS-VALVES, HYDRAULIC REGULATORS, VACUUM GOVERNORS, PATENT RETORT-LIDS, STEAM, PUMPS for Tar, Liquor, or Water; CENTRIFUGAL PUMPS and PUMPING ENGINES, specially adapted for Water-Works, raising Sewage, &c.

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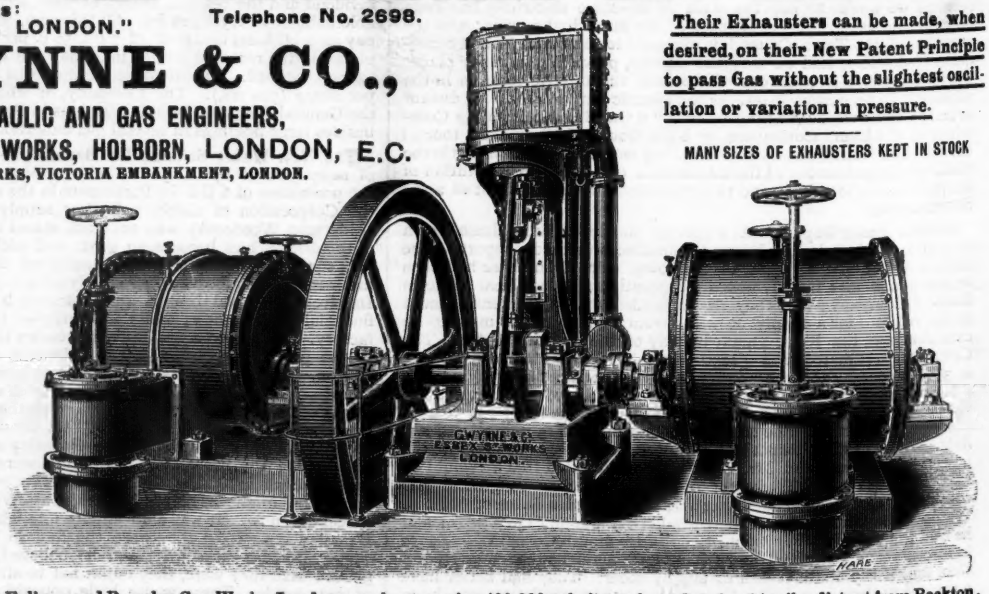

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NOTICE TO ADVERTISERS.—COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office *not later* than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or Stoppages of PERMANENT ADVERTISEMENTS should be received not later than the FIRST POST on SATURDAY.

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ROBERT BRUCE FITZMAURICE, 29, Great St. Helens, London, Shipping Agent to several Gas Companies and Plant Manufacturers, would be glad to UNDERTAKE LARGE or SMALL SHIPMENTS to any Port.

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Telegrams: "HUTCHINSON BROS., BARNSLEY."

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*** See Advertisement p. II., centre of JOURNAL.
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WANTED, a First-class Traveller, to push a Speciality. Must have undoubted connection with Gas Companies. Salary, Commission, and Expenses.
State, by letter, Salary, Experience, Age, and District of connection, to No. 2457, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

BOROUGH OF SOUTHPORT.

THE Gas Committee of the Southport Corporation invite APPLICATIONS for the position of SUB-GAS MANAGER and DRAUGHTSMAN. Commencing Salary, £150 per annum.
Candidates must state Age, present and past Employment, and Qualifications, and must submit *copies* of not more than three recent Testimonials.
Applications, endorsed "Sub-Manager," must be delivered at my Office not later than Tuesday, the 11th day of December next.

J. DAVIES WILLIAMS,
Town Clerk.

Nov. 29, 1894.

TEN-HORSE Power "Trusty" Gas- ENGINE, by Weyman, FOR SALE. Cost £220 two years ago. Will be sold for half-price, to clear at once. Guaranteed in good working order.
Apply to W. BIRCH, HIGH WYCOMBE.

FOR SALE—Second-Hand Telescopic GASHOLDER, 60 ft. diameter by 10 ft. 6 in. deep each Lift, in Cast-Iron Tank.
Price and all Particulars on application to No. 2461, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

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C. E. MULLER AND CO.
Middlesbrough, November, 1894.

COUNTY BOROUGH OF HALIFAX.

THE Gas-Works Committee of the Halifax Corporation are prepared to receive TENDERS for the supply of FIRE-CLAY GOODS and GAS-METERS.
Forms of Tender may be obtained on application to Mr. Thomas Holgate, Engineer, Gas-Works, Halifax.
Tenders, endorsed Tender for "Fire-Clay Goods," or "Meters," as the case may be, must be sent to the undersigned, on or before the 17th of December, 1894.
The tender of any person paying less than the minimum standard rate of wages, and who does not observe the hours and conditions of labour generally recognized in the district, will not be accepted. This condition shall be construed to the Acts of Sub-Contractors, where such may exist.
The Committee do not bind themselves to accept the lowest or any tender.

By order,
KEIGHLEY WALTON,
Town Clerk.

CORPORATION OF LEICESTER.

CAST-IRON PIPE CONTRACT.

THE Gas Committee of the above Cor- poration are prepared to receive TENDERS for the supply and delivery of the necessary CAST-IRON PIPES and CONNECTIONS, from 2 inches to 24 inches in diameter, required during the Twelve Months ending the 31st of December, 1895.
Specification and Form of Tender to be obtained from the Engineer.
Tenders, addressed to Alderman Lennard, Chairman, and endorsed "Tender for Cast-Iron Pipes, &c.," to be delivered at these Offices not later than Eleven o'clock a.m., on Saturday, Dec. 8, 1894.
The Committee do not bind themselves to accept the lowest or any tender.

ALFRED COLSON, M.Inst.C.E.,
Engineer and Manager.
Gas Offices, Millstone Lane, Leicester,
Nov. 13, 1894.

CORPORATION OF LEICESTER.

RETORTS AND FIRE-BRICKS.

THE Gas Committee of the above Cor- poration are prepared to receive TENDERS for the supply and delivery of RETORTS and FIRE-BRICKS.
Specification, Quantities, and Form of Tender can be obtained from the Engineer.
Tenders, addressed to Alderman Lennard, Chairman, and endorsed "Tender for Retorts, &c.," to be delivered at these Offices not later than Eleven o'clock a.m., on Saturday, Dec. 8, 1894.
The Committee do not bind themselves to accept the lowest or any tender.

ALFRED COLSON, M.Inst.C.E.,
Engineer and Manager.
Gas Offices, Millstone Lane, Leicester,
Nov. 13, 1894.

TO IRONFOUNDERS AND OTHERS.

THE Harrogate Gas Company invite TENDERS for sundry CAST and WROUGHT IRONWORK and STEELWORK required in the construction and erection of a Retort-House.
The Drawings and Specification may be seen on application to Mr. G. S. Sayner, Manager, Gas-Works, Harrogate, and at the Office of Mr. Thomas Newbigging, C.E., 5, Norfolk Street, Manchester. Bills of Quantities and Forms of Tender may be obtained from the latter on payment of Two Guineas, which will be returned on receipt of a *bond-fide* tender.
Sealed tenders, endorsed "Retort-House, Contract No. 7," to be addressed to the Chairman, Gas Company, Harrogate, and delivered to me not later than Twelve o'clock Noon, on Tuesday, the 18th day of December, 1894.
The Directors do not bind themselves to accept the lowest or any tender.

H. WILKINSON,
Secretary
Gas Offices, Harrogate,
Dec. 1 1894.

BRICK GASHOLDER TANK.

TENDERS are invited for a Brick Gas-HOLDER TANK, 36 ft. diameter by 14 ft. 3 in. deep.

Specification and Drawing can be inspected at the Offices of the undersigned on and after Tuesday, the 4th of December, to whom tenders, endorsed "Tender for Brick Tank," must be delivered on or before Monday, the 24th of December, 1894.

SAMUEL WHILE.

60, Queen Victoria Street, E.C.

RAMSGATE CORPORATION.
(GAS AND WATER DEPARTMENT.)

THE Gas and Water Committee invite TENDERS for about 1700 feet of Stourbridge or other approved quality FIRE-CLAY RETORTS, 22 in. by 16 in., 5000 FIRE-BRICKS, TILES, and 10 tons of CLAY.

Tenders to be sent in on or before Noon on Monday, Dec. 17, 1894, addressed to the Chairman of the Gas and Water Accounts Committee, Hardres Street, Ramsgate, endorsed "Tenders for Fire-Clay Goods."

Specification and full Particulars on application to

WILLIAM A. VALON,
Engineer.

THE Directors of the Worksop Gas Company invite TENDERS for the purchase of the surplus TAR and the AMMONIACAL LIQUOR made at their Works, from the 1st of January to the 31st of December, 1895.

Tenders for Tar to state price per ton delivered into Purchasers' Tanks at the Worksop Railway Station. Tenders for Liquor to state price per ton, as tested by No. 1 Twaddel's Hydrometer, delivered into boats near the Company's Works.

The Directors do not bind themselves to accept the highest or any tender.

Tenders to be sent in by the 27th of December.

Worksop, Dec. 1, 1894.

OLDBURY LOCAL BOARD OF HEALTH.
(GAS DEPARTMENT.)

THE Gas Committee of the above Board are prepared to receive TENDERS for the purchase of the surplus TAR produced at their Works for a period of One, Two, or Three Years, as they may think fit, from the 1st day of January, 1895.

Further Particulars may be obtained from the undersigned.

Tenders, sealed and endorsed "Tender for Tar," addressed to the Chairman of the Gas Committee, to be delivered to me not later than Monday, Dec. 17 inst.

The Committee do not bind themselves to accept the highest or any tender.

A. COOKE,
General Manager.

Gas-Works, Oldbury,
Nov. 28, 1894.

BOROUGH OF BURTON-UPON-TRENT.

FIRE-CLAY GOODS.

THE Mayor, Aldermen, and Burgesses of the Borough of Burton-upon-Trent, acting by the Council, invite TENDERS for the supply of the FIRE-CLAY RETORTS, BRICKS, and CLAY required at the Gas-Works during the Year 1895.

Full Particulars of the Specifications and Conditions, with Form of Tender, may be obtained on application to the undersigned, to whom sealed tenders, endorsed "Fire-Clay Goods," must be delivered on or before Friday, the 21st day of December inst.

The lowest or any tender will not necessarily be accepted.

F. L. RAMSDEN,
Manager and Engineer.

Gas and Electric Light Works,
Burton-upon-Trent,
Dec. 1, 1894.

KENT WATER-WORKS COMPANY.

SALE BY TENDER OF £20,000 FIVE PER CENT. DEBENTURE STOCK.

MINIMUM PRICE £166 PER CENT.

THE Directors invite Tenders for the Issue on Sale, to the highest bidders, of £20,000 of FIVE PER CENT. PERPETUAL DEBENTURE STOCK, authorized to be raised under the Kent Water-Works Act, 1877.

The Total Ordinary Capital is £868,000; and the existing Mortgage Capital, £42,000.

Tenders must be sent in on or before Tuesday, the 18th of December.

Forms, with Particulars and Conditions, may be obtained on application to the Secretary.

Tenders below the minimum price of £166 for each £100 of Stock cannot be accepted.

By order of the Directors,
ALEXANDER DICKSON,
Secretary of the Company.

Kent Water-Works Offices, Mill Lane,
Deptford, S.E., Nov. 30, 1894.

BY ORDER OF THE DIRECTORS OF CROYDON COMMERCIAL GAS AND COKE COMPANY.

SALE OF £13,750 FIVE PER CENT. PERPETUAL DEBENTURE STOCK.

MESSRS. HOOKER and WEBB have received instructions to SELL BY AUCTION at the Auction Mart, Tokenhouse Yard, London, E.C., on Tuesday, the 18th of December, 1894, at Two o'clock precisely, in 138 lots, £13,750 FIVE PER CENT. PERPETUAL DEBENTURE STOCK of the Croydon Commercial Gas and Coke Company, to be created under the Provisions of the Croydon Gas Act, 1894. The security is ample; and the sale is an unusually good opportunity to Trustees and Capitalists of making a permanent and safe Investment.

Particulars and Conditions of Sale may be obtained of W. J. RUSSELL, Esq., the Secretary, at the Offices of the Company, Katharine Street, CROYDON; Messrs. BLYTH, DUTTON, HARTLEY, AND BLYTH, Solicitors, 112, Gresham House, LONDON, E.C., and of the AUCTIONEERS, 4, High Street, CROYDON.

THE GASLIGHT AND COKE COMPANY.

NOTICE is Hereby Given, that the TRANSFER BOOKS of this Company, so far as they relate to DEBENTURE STOCKS and BONDS, WILL BE CLOSED at Four o'clock p.m. on Monday, the 10th prox., for the Half Year ending on the 31st prox., and will be RE-OPENED on the Morning of Tuesday, the 11th prox.

The Interest for the Half Year will be payable on the 1st of January next, to the Proprietors registered on the closing of the Books.

By order,
JOHN WILLIAM FIELD,
Secretary and General Manager.

Chief Office: Horseferry Road,
Westminster, S.W., Nov. 28, 1894.

TOTTENHAM AND EDMONTON GASLIGHT AND COKE COMPANY.

NOTICE is Hereby Given, that the TRANSFER BOOKS of this Company so far as they relate to the FOUR PER CENT. PERPETUAL DEBENTURE STOCK WILL BE CLOSED at Ten o'clock forenoon, on Friday, the 14th inst., for the Half Year ending on the 31st of December, 1894, and will be RE-OPENED on Monday, the 17th inst.

The Interest for the Half Year will be payable on the 1st day of January, 1895, to the Proprietors registered on the closing of the Books.

By order of the Board,
JAMES RANDALL,
Secretary.

Gas Offices: Willoughby Lane,
Tottenham, Dec. 1, 1894.

SOUTH METROPOLITAN GAS COMPANY.

SALE BY TENDER OF £25,000 FIVE PER CENT. PERPETUAL DEBENTURE STOCK.

MINIMUM PRICE £157 PER CENT.

NOTICE is Hereby Given, that it is the intention of the Directors of this Company to SELL BY TENDER £25,000 of 5 per Cent. PERPETUAL DEBENTURE STOCK, in accordance with the Provisions of the South Metropolitan Gas Act, 1882.

Particulars of same, with Form of Tender, can be obtained at this Office on application to the undersigned; and tenders must be sent in on or before Tuesday, the 18th day of December next.

The Stock will be allotted to the highest bidders; but no tender will be accepted at a lower price than at the rate of £157 money for each £100 Debenture Stock.

By order,
FRANK BUSH, Secretary.

Office: 709A, Old Kent Road, S.E.,
Nov. 16, 1894.

EAST LONDON WATER-WORKS COMPANY.

ISSUE OF £100,000 3 PER CENT. DEBENTURE STOCK. MINIMUM PRICE, PAR.

NOTICE is Hereby Given, that the Directors are prepared to receive TENDERS for the above Issue (being the First portion of the £500,000 DEBENTURE STOCK, created under the East London Water-Works Company's Act of 1894), bearing Interest at 3 per cent. per annum, less income-tax, and redeemable after the expiration of 25 years from the date of issue, subject to six months' notice being given by the Company. Minimum price, par.

Tenders must be delivered at the Company's Offices St. Helen's Place, Bishopsgate Street, E.C., not later than Eleven a.m., on Thursday, the 13th day of December ensuing.

Particulars and Conditions, together with Form of Tender, may be obtained at the said Offices, or will be forwarded on application.

By order of the Court of Directors,
I. A CROOKENDEN,
Secretary.

St. Helen's Place,
Bishopsgate Street, E.C.,
Nov. 15, 1894.

HOLMSIDE GAS COALS.

(Wrought out of Holmside and South Moor Collieries.)

PRESENT production 4000 tons per working day. Area of coal about 5000 acres, including the largest remaining workable proportion of pure HUTTON SEAM GAS COAL. Analysis of HOLMSIDE GAS COAL *in bulk as shipped* gives 10,500 cubic feet of Gas per ton, of an Illuminating Power of 16½ candles. The Sulphur is about 1 per cent., and the Ash 1¾ per cent. The Coal cokes well, and leaves about 70 per cent. of excellent Coke. To show the progress of HOLMSIDE COALS, it may be mentioned that the quantity carbonized by the London Gas Companies in 1885 was about 200,000 tons; whereas the present consumption of HOLMSIDE COALS in London alone is at the rate of nearly

600,000 Tons per Annum.

Full particulars on application to

MR. MARK ARCHER,

HOLMSIDE AND SOUTH MOOR OFFICES,

NEWCASTLE-ON-TYNE.

NOTICE.

TO GAS ENGINEERS AND OTHERS.

THE undersigned begs to intimate that Messrs. Clapham Bros., Limited, Keighley, Yorkshire, are no longer authorized to Manufacture his CONDENSER and WASHER-SCRUBBERS.

The above-named Gas Apparatus are erected and giving entire satisfaction at the following places: Neath, Lincoln, Sheffield, Ellesmere, Mountain Ash, Malden, Cullingworth, Montreal (Canada), Woodstock (South Africa), Cape Town (South Africa), &c.

These Appliances can now be obtained solely of the undersigned.

J. A. KELMAN.

Winchester House, London, E.C.

NOTICE.

TO GAS ENGINEERS AND OTHERS.

CLAPHAM BROS., LIMITED, of Keighley, Yorks., beg to intimate that they are the SOLE MAKERS of LAYCOCK & CLAPHAM'S "ECLIPSE" WASHER-SCRUBBER, and that no person or persons beyond the Patentees and Makers have ever had any interest whatever in the patent.

They are also the SOLE MAKERS of CLAPHAM'S PATENT IMPROVED "ECLIPSE" CONDENSER, as supplied to Bradford, Manchester, and other Gas-Works.

Orders and Inquiries promptly attended to. See advertisement in next week's JOURNAL.

Fcap. 4to, Cloth, price 7s. 6d., post free.

Practical Photometry.

By William Joseph Dibdin, F.I.C., F.C.S.

LONDON: WALTER KING, 11, Bolt Court, FLEET STREET.

HARCOURT'S COLOUR TEST.

For Carbon Bisulphide, Sulphuretted Hydrogen, and Carbonic Acid in Coal Gas.

The Materials for the above Tests may be obtained from

Mr. S. E. MILLER, 115, Cowley Road, Oxford.

COKE BREAKERS.

G. R. Mather & Son, Engineers, Wellingborough

BOLDON GAS COALS.

Worked by THE HARTON COAL CO., LTD.

Output about 3000 tons per day.

ANALYSIS—

Yield of Gas per ton	10,500	Cubic Feet.
Illuminating Power	16·9	Candles.
Coke	66·7	Coke.
Sulphur	0·86	Sulphur.
Ash	2·04	Ash.

Boldon Gas Coals are supplied under contract to

The Gaslight and Coke Company, South Metropolitan Gas Company, Imperial Continental Gas Association, European Gas Company, L'Union des Gaz (the Continental Union Gas Company), Crystal Palace District Gas Company, Bombay Gas Company, San Paulo Gas Company, Ipswich Gaslight Company, Newcastle Gas Company, Sunderland Gas Company, South Shields Gas Company, and to many other Companies at Home and Abroad.

For prices, &c., apply to the

HARTON COAL COMPANY,
LIMITED,
Newcastle-on-Tyne.

W. H. PARKINSON,
FITTER.

WILLEY & CO.

GAS ENGINEERS & CONTRACTORS,

Central Works: Commercial Road, **EXETER**;

Meter Works: James Street, **EXETER.**

Telegraphic Address: "WILLEY, EXETER." Telephone No. 132.

Edison-Bell Phonograph Used.

Manufacturers of every Requisite for Gas-Works.

Specialities: GASHOLDERS, GAS-METERS, GAS-FITTINGS.

WILLEY AND CO. beg to announce that they have recently acquired the Sole Right and Proprietorship of the

"SIMPSON"

Automatic Penny-in-the-Slot Meter

(By Royal Letters Patent).

An application of the "Vernier Principle," ensuring Mathematical Accuracy of Registration, combining all the latest Scientific Improvements.

PRICE INSTANTLY, SIMPLY, & READILY ADJUSTED *IN SITU*, BY SINGLE FEET OR HALF FEET, WITHOUT CHANGE OF WHEELS.

STRENGTH, DURABILITY, & MINIMUM SIZE.

AMPLE WARNING & GRADUAL EXTINCTION.

BASE OR MISTAKEN COIN DETECTED & RETURNED.

Terms on Application.

New Catalogue of GAS-FITTINGS of novel and registered designs, with Special Quotations to Gas Companies, now in the Press for circulation early in the New Year.

Agents for the "MAXIM PATENT CARBURETTOR" New Process of Gas Enrichment by Carburine.

ARMSTRONG'S
PATENT
CANDLE SAFETY LAMPS.

Are a great improvement on Oil, giving a good Light, requiring little or no Cleaning, and when once lighted no further attention is necessary. The Candles are made to burn 5, 7, or 9 hours.

43, Manchester Street, Gray's Inn Road, W.C.

HUNTER'S
OXIDE OF IRON.

James Hunter, Miner, and Shipper of
NATURAL IRISH BOG ORE.

This Estate yields the finest and most uniform quality in Ireland; and the quality is guaranteed.

Samples and Prices on application.

11, BAY STREET, PORT GLASGOW.

Telegrams: "Hunter, Port Glasgow."
Established 1872.

THE
STOVE FOR 1894-5.

THE KING OF STOVES

A SANITARY GAS-STOVE

Requires no Flue.

Guaranteed free from Smell and Fumes.

ADVANTAGES:—

1. Freedom from smell or fumes.
2. Great heating capacity.
3. Absolute safety. Can be placed on a carpet or near a wall. Recommended by Fire Insurance Companies.
4. Requires no flue; hence can be placed in any part of a room.
5. Heat under perfect control.
6. Absolute cleanliness.
7. Cheerful in appearance.

Suitable for

SHOPS, HALLS, OFFICES, CLUBS, SITTING-ROOMS, BEDROOMS, LIBRARIES, BATH-ROOMS, AND ALL DOMESTIC PURPOSES, ALSO FOR CHURCHES, CHAPELS, MISSION-ROOMS, Etc.

Send for Price List and Trade Terms to Manufacturers—

BROWN, MICHEL, & PAGE, Ltd.,
53, New Oxford Street, London, W.C.

TAR AND LIQUOR PURCHASED.

JOHN CLARKSON MAJOR,

(Established 1851,)

Tar Distiller and Manufacturing Chemist,
WOLVERHAMPTON.

COKE BREAKERS,

PRICES REDUCED.
(THOMAS & SOMERVILLE'S PATENT.)
New Design, with two Cutting Rollers, making less Breeze than their old pattern.

GEORGE WALLER & CO.,
PARK STREET, SOUTHWARK, E.C.,
And at STROUD, GLOUCESTERSHIRE.

Awarded HIGHEST MEDAL and DIPLOMA at the Newcastle-on-Tyne Royal Mining and Industrial Exhibition, 1887, for

CANNEL & COAL.

TYNE
BOGHEAD CANNEL.

Yield of Gas per ton	13,155 cub. ft.
Illuminating Power	38·22 candles.
Coke per ton	1,301·88 lbs.

EAST PONTOP GAS COAL.

Yield of Gas per ton	10,500 cub. ft.
Illuminating Power	16·3 candles.
Coke	70 per cent.

SOUTH PELAW MAIN GAS COAL.

Yield of Gas per ton	10,500 cub. ft
Illuminating Power	16·3 candles.
Coke	73·1 per cent.

For Prices and complete Analysis, apply to

THOS. W. DANCE & SONS,
Coal Owners, Newcastle-on-Tyne;
or
E. FOSTER & CO.,
21, John Street, Adelphi, London, W.C.

T. B. KITTEL, SHEFFIELD.

CONTRACTS FOR SUPPLIES OF ANY OF THE PRINCIPAL

ENGLISH & SCOTCH CANNELS.

REAL SILKSTONE GAS COAL

ANALYSIS AND PRICES ON APPLICATION.

T. B. KITTEL, SHEFFIELD.

SULPHATE OF AMMONIA SATURATORS.

JOSEPH TAYLOR & CO.,
Central Plumbing Works, Town Hall Square,
BOLTON.

Practical Makers of all kinds of Saturators, and Specialists in every description of Lead Work required in connection with Sulphate Plants.
Special attention to Repairs.
Seven Saturators placed with us the present Year.

Highest References on Application.

LONDONDERRY GAS COALS

FROM THE
MARQUIS OF LONDONDERRY'S COLLIERIES,

COUNTY OF DURHAM.

Available output up to 5000 tons per day.
Yield of Gas 11,000 cubic feet per ton of Coal as per analysis by
Mr. John Pattinson, F.C.S., F.I.S.

For Prices and Particulars, apply to

S. J. DITCHFIELD,
SEAHAM HARBOUR, COUNTY OF DURHAM.

THORNLEY GAS COALS

Worked by the
WEARDALE IRON AND COAL COMPANY, Ld.
OUT OF THEIR
THORNLEY AND WHEATLEY HILL COLLIERIES.

The Analysis made by Messrs. J. and H. T. Pattinson, Public Analysts for Northumberland, gives 10,500 cubic feet of Gas per ton, with an Illuminating Power of 16·3 Candles and 67·3 per cent. of Coke. The following is a Working Analysis made of these Coals by the Tudhoe and Sunderland Bridge Gas Company:—

[COPY.]

Tudhoe and Sunderland Bridge Gas Company.
Tudhoe Gas-Works,
Spennymoor,
8th June, 1893.

Messrs. The
WEARDALE IRON & COAL COMPANY, LTD.

Gentlemen,

For the last two months we have used your **THORNLEY GAS COAL** exclusively at these gas-works; and I have pleasure in herewith giving you the actual results obtained during the trial.

Yield of Gas per ton: 10,300 cubic feet.
Yield of Coke: 13½ cwt.
Illuminating Power of Gas, average of a series of tests, **17 Sperm Candles.**
The Coke was of excellent quality.
The following is a complete ultimate Analysis of the Coal.

	Per Cent.
Carbon	83·128
Hydrogen	5·116
Oxygen	7·401
Nitrogen	0·585
Sulphur	0·620
Ash	3·130
Water	0·020
	100·000

Analysis of the Coke.

Carbon	93·31
Sulphur	0·61
Ash	5·00
Moisture	1·08
	100·00

I am, Gentlemen,
Yours truly,
A. B. Cowan,
Manager.

For Price, &c., apply to the
WEARDALE IRON & COAL Co., Ld.
QUAYSIDE, NEWCASTLE-ON-TYNE.

NEWBATTLE CANNEL.

Highest Results in Gas, & Excellent Coke.

QUOTATIONS ON APPLICATION TO

THE LOTHIAN COAL COMPANY,
LIMITED,
NEWBATTLE COLLIERIES,
DALKEITH, N.B.

UNEQUALLED.

Gas Companies are solicited to try Samples of the

MIRFIELD
BLACK BED GAS COAL.

Prices and Analysis on application.

MIRFIELD (GAS-COAL) COLLIERY COMPY.
RAVENSTHORPE, NEAR DEWSBURY.

PIPES, 2-in. to 8-in.
2-in. **PIPES,** to 8-in.
PIPES.

MONIER-WILLIAMS & Co.
IRONFOUNDERS,
MIDDLESBROUGH.

ROBERT MARSHALL,
CANNEL COAL MERCHANT,
97, WELLINGTON STREET, GLASGOW.

Prices and Analysis of all the Scotch Cannels on Application.

HEATHCOTE GAS COAL.

Rich in Illuminating Power & Yield of Gas.
Above the average in Weight & Quality of Coke.
Maintains a High Standard in Residuals.

THE GRASSMOOR Co., Ld.,
CHESTERFIELD.

THOMAS TURTON
AND SONS, LIMITED,
SHEAF WORKS, SHEFFIELD,
MANUFACTURERS OF
FILES OF BEST QUALITY
FOR ENGINEERS.
STEEL OF ALL DESCRIPTIONS.
SCREW STOCKS, TAPS AND DIES,
SPANNERS, RATCHET BRACES, LIFTING JACKS,
ANVILS, VICES,
AND ENGINEERS' TOOLS GENERALLY.
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TROTTER, HAINES, & CORBETT,
Brettell's Estate
FIRE-CLAY & BRICK WORKS,
STOURBRIDGE.

Manufacturers of GAS-RETORTS, GLASSHOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICKS.
Proprietors of
BEST GLASSHOUSE POT & CRUCIBLE CLAY.
SHIPMENTS PROMPTLY AND CAREFULLY EXECUTED.

HEBBURN MAIN GAS COALS.

Yield of Gas per ton . . . . . 10,500 cubic feet.
Illuminating Power . . . . . 16·4 candles.
Coke . . . . . 68 per cent.

For prices, f.o.b. Ship or Delivered by Rail, apply to
THE WALLSEND & HEBBURN COAL COMPANY, LTD.
8 Lombard Street,
NEWCASTLE-ON-TYNE.
W. RICHARDSON, Fitter.

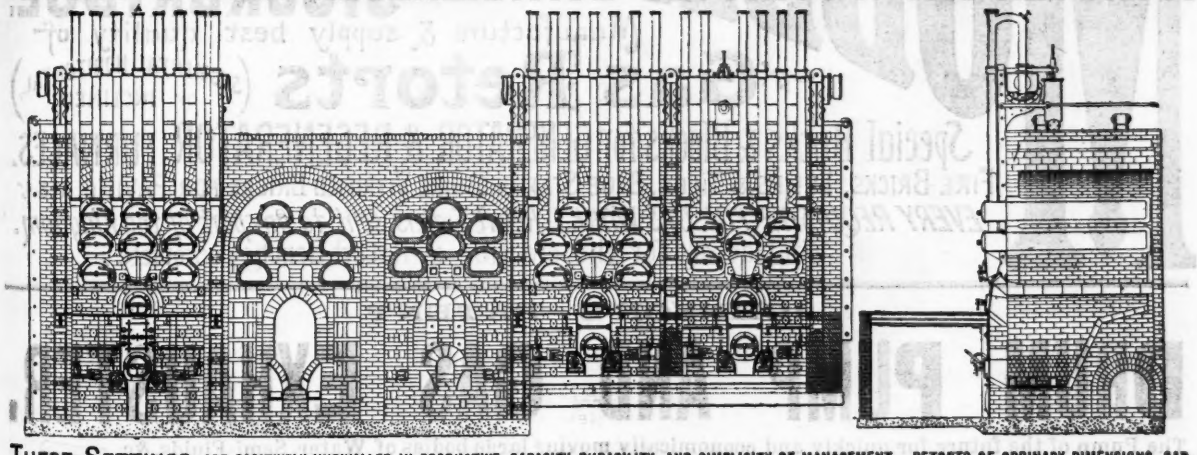
CAST-IRON PIPES
FOR GAS AND WATER.

Pipes, One to Six inch Bore, kept in Stock. Also a very large assortment of all sizes of Bends, T-pieces, and Specials ready for despatch on receipt of Order.

VALVES
FOR GAS, WATER, AND STEAM.

TELEGRAMS: "PIPES GLASGOW."
WM. MACLEOD & CO.,
56, ROBERTSON STREET, GLASGOW

HISLOP'S PATENT REGENERATIVE SETTINGS OF GAS-RETORTS.



THESE SETTINGS ARE POSITIVELY UNRIVALLED IN PRODUCTIVE CAPACITY, DURABILITY AND SIMPLICITY OF MANAGEMENT. RETORTS OF ORDINARY DIMENSIONS, CARBONIZING FROM 18 TO 24 CWT. OF ENGLISH AND 21 TO 26 CWT. OF SCOTCH COAL PER 24 HOURS, DEPENDING UPON THE NATURE OF THE COAL, AND PRODUCING UP TO FULLY 13,000 CUBIC FEET PER MOUTHPIECE IN THE SAME TIME, AND WITH THE SMALLEST EXPENDITURE OF FUEL ATTAINABLE, AND RETURNING IN PROFIT THE ENTIRE COST OF ERECTION WITHIN TWELVE TO EIGHTEEN MONTHS AND THUS REDUCING TO INSIGNIFICANCE THE INCREASED COST OF THESE SETTINGS OVER THE COMMON OR GENERATOR FURNACE SYSTEMS.

THESE SETTINGS ARE EXTENSIVELY ADOPTED, AND ARE ERECTED UPON THE SHALLOW AND STAGE FLOOR PLANS. THEY ARE ADAPTED TO ANY EXISTING ARRANGEMENTS, AND PERFECT SATISFACTION GUARANTEED. THE COMPOSITION OF FIRE-RESISTING AND OTHER SPECIAL FIRE-CLAY MATERIALS FURNISHED IS OF THE HIGHEST ORDER; AND THE SYSTEM AS A WHOLE, AS NOW PERFECTED, IS THE RESULT OF LONG EXPERIENCE AND CAREFUL STUDY OF THE PRINCIPLES OF GASEOUS FIRING.

Drawings and Specifications are furnished for the complete erection of Ovens, with or without Retort and Bench Mountings; or complete erection undertaken if required, and carried out by specially Trained Workmen.

Further particulars may be obtained on application to the Patentee's Agents: C. M. HAMILTON, 5, Stuart Street, Shawlands, Glasgow; J. E. FISHER, Stourbridge; JOHN WALSH & SONS, Retort Builders, Halifax, Yorkshire; RICHARD TURNER, Retort Builder, Denton, Lancashire; and from the Principal Agent, R. F. HISLOP (son of Patentee), Gas-Works, Paisley, N.B.

HISLOP'S PATENT HYDRAULIC MAIN SEAL-REGULATING AND TAR-EXTRACTING VALVE is a *Sine qua non* TO THE SATISFACTORY WORKING OF THE HYDRAULIC MAIN UNDER THE REGENERATIVE AS WELL AS OTHER SYSTEMS OF RETORTS. BEING LARGELY ADOPTED AND AFFORDING THE HIGHEST SATISFACTION.

SPENT LIMES NO LONGER WASTE PRODUCTS

Under G. R. HISLOP'S Patents, all Spent Limes are most effectually, economically, and continuously recovered at from one-third to one-half the cost of New Lime. The results are a surprise to all who have inspected the process, and are entirely satisfactory to all now using it.

Descriptive Pamphlets and Terms from Agents as above.

THE ECONOMICAL GAS APPARATUS CONSTRUCTION COMPANY, LTD.

CARBURETTED WATER GAS ENGINEERS.

"Merrifield-Westcott-Pearson" Setting

GUARANTEED to give BETTER RESULTS than any other Plant in the Market.

London Offices: SUFFOLK HOUSE, LAURENCE POUNTNEY HILL, E.C.

TELEGRAPHIC ADDRESS: "ROBUSTNESS, LONDON." EXCHANGE TELEPHONE 1758.

GASEOUS FIRING FOR LARGE OR SMALL RETORT-SETTINGS

PLANS, SPECIFICATIONS, AND ESTIMATES SUBMITTED.

SPECIALTIES

J. & H. ROBUS,

20, BUCKLERSBURY, LONDON, E.C.

ENGINEERS & CONTRACTORS FOR THE ERECTION OF GAS AND WATER WORKS COMPLETE, AND FOR EXTENSIONS AND RENEWALS.

MOBBERLEY & PERRY STOURBRIDGE.

Manufacture & supply best quality of

Gas Retorts (SEGMENTAL, HORIZONTAL, or INCLINED.)

Special Bricks & Blocks for GENERATOR & REGENERATOR FURNACES.

FIRE BRICKS, LUMPS, & TILES; BLUE STAFFORDSHIRE VITRIFIED BRICKS FOR PAVING, &c.&c.

EVERY REQUISITE FOR GAS-WORKS. Retort Setters sent to any part of the Kingdom.

Contractors for the erection of Retort-Benches complete.

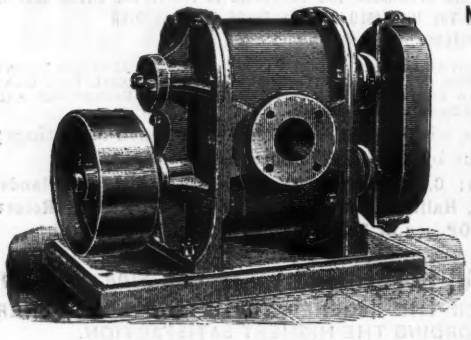
JOHNSON'S PATENT

DRUM PUMP AND GAS EXHAUSTER.

The Pump of the future for quickly and economically moving large bodies of Water, Semi-Fluids, &c.

The force of the Piston Pump with the capacity of the Centrifugal combined.

NO SLIDES OR FRICTIONAL WORKING PARTS.



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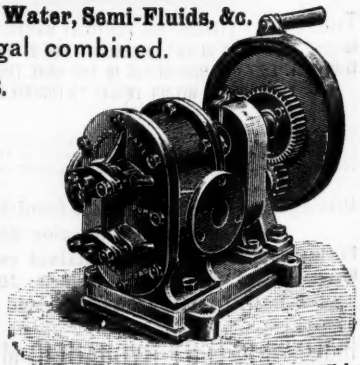
NO VALVES.



As supplied to H.R.H. the Prince of Wales for Pumping Gas Liquor at his Sandringham Gas-Works.

DRUM ENGINEERING COMPANY,

Hydraulic and Pneumatic Engineers, 55, ATHOL ROAD, BRADFORD.

"BEAR CREEK"

The best **KENTUCKY CANNEL** in the Market.

SAMPLE CARGO will demonstrate the extraordinary value of this Coal, and of the resultant Coke and other Bye-Products.

The unlimited quantity and REDUCED PRICE of this Material makes it the most satisfactory and economical Gas Enricher now available

COKE.—Briefly the "Bear Creek" Cannel produces a first-class Coke—that is, by itself, and unmixed with Coke from Common Coals—merchantable, comparing favourably with Coke from the Standard Gas Coals.

Correspondence solicited. Printed Reports, Analyses, and Samples for Testing sent on application.

For Cargo Prices either c.i.f. or f.o.b. Norfolk or Newport News, Va., or Pensacola, Florida, address

The Log Mountain Coal, Coke, and Timber Company,
PINEVILLE, KENTUCKY, U.S.A.
Cable Address: "HULL, PINEVILLE" (A.B.C. Code).

THE SILICA FIRE-BRICK COMPANY,

OUGHTYBRIDGE, NEAR SHEFFIELD.

Established 1858. The First Manufactory of Silica and Dinas Fire-Bricks erected in England.

MANUFACTURERS OF

SILICA FIRE-BRICKS

(TRADE MARK "SILICA")

Specially adapted for Siemens-Martin Gas-Furnaces; also for Gas, Copper, Iron, Steel, and other Furnaces where intense heat is required.

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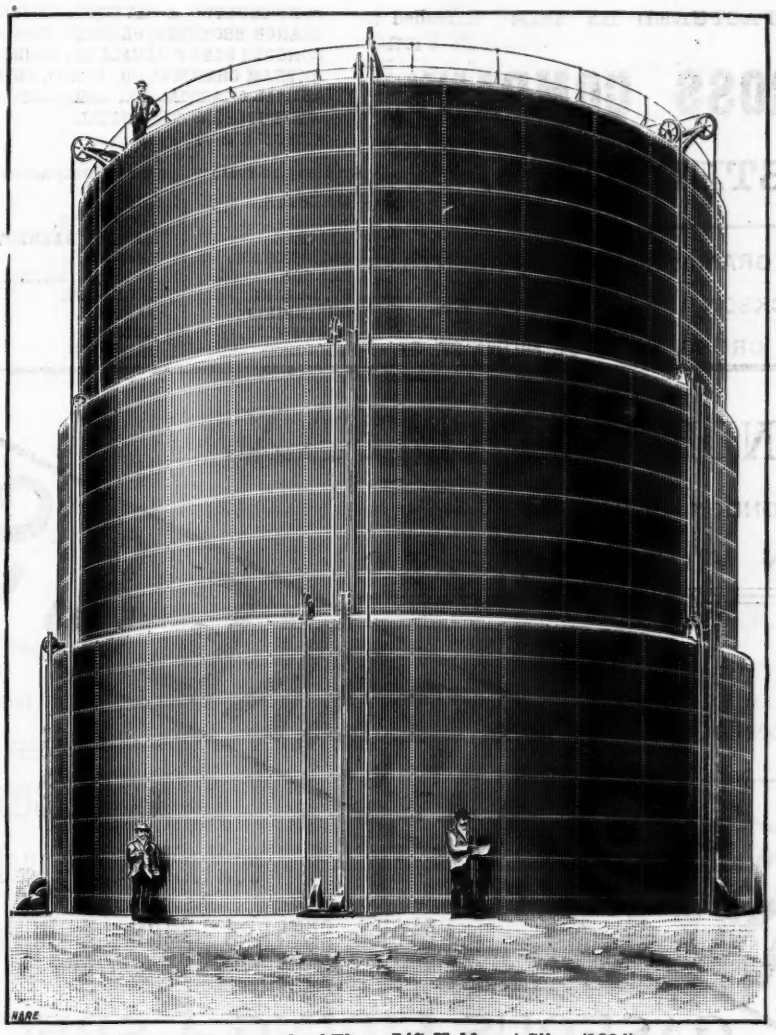

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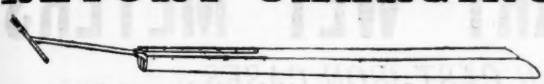

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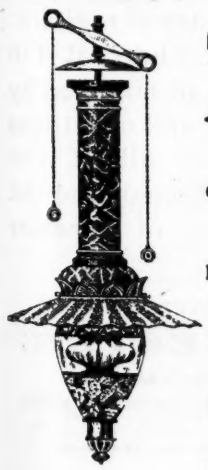

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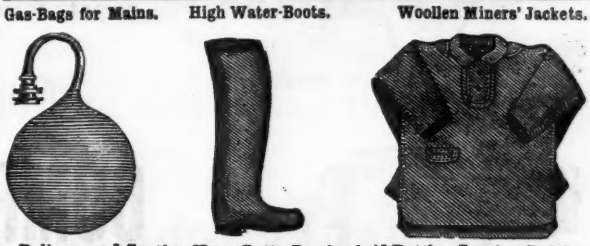

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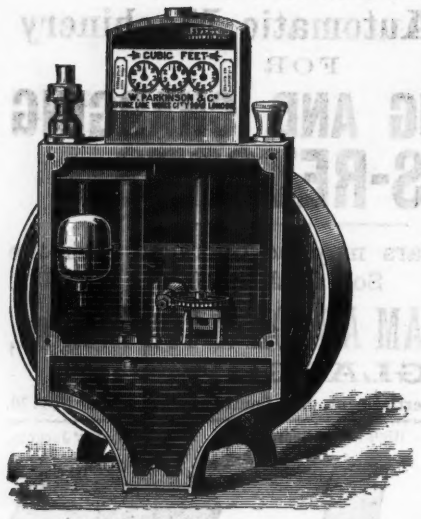

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[See also Advt., p. 1060.

LONDON: Printed by WALTER KING (at the Office of King, Sell, and Railton, Ltd., 12, Gough Square); and published by him at 11, Bolt Court, Fleet Street, in the City of London.—Tuesday, Dec. 4, 1894.